Vol. 8, No. 18
September 30, 1983

Energy Research Abstracts

Abstracts 43146-45322

Technical Information Center
UNITED STATES DEPARTMENT OF ENERGY

CURRENT AWARENESS PUBLICATIONS ON ENERGY

To provide complete coverage of literature related to major Department programs, announcement publications that are comprehensive in their coverage of certain energy fields are issued regularly. All information in these publications, plus additional backup information, is included in the Energy Data Base of the Technical Information Center; all references are also available for machine searching via the on-line retrieval system, DOE/RECON, and the commercial on-line retrieval systems. Descriptions of these current awareness publications, which are supported either directly or indirectly by the DOE, appear below. Department of Energy components may receive the listed publications free from the Technical Information Center, P.O. Box 62, Oak Ridge, TN 37830. Telephone (615) 576-1303; (FTS) 626-1303.

PUBLICATIONS OF THE TECHNICAL INFORMATION CENTER

Energy Abstracts for Policy Analysis (EAPA)

A monthly abstract journal devoted to the analysis of energy research, conservation, and policy. Scope and coverage are limited to substantive articles or reports and emphasize the following: programmatic efforts; legislative, regulatory, and other legal aspects; social, economic, and environmental impacts; regional and sectoral analyses; institutional factors, etc. *EAPA* is available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402; domestic subscribers $6.00, foreign $7.50 per copy; annual cumulative index, domestic $10.00, foreign $12.50 per copy. The annual subscription price is $70.00 for domestic subscribers and $87.50 for foreign subscribers.

Energy Research Abstracts (ERA)

A comprehensive semimonthly abstract journal devoted to all areas of energy-related information produced by the Department of Energy, other U. S. government organizations, and foreign governments. *ERA* is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign).

The following publications are available to the public on a subscription basis from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual subscription rate for one volume (calendar) year (12 issues plus cumulative index) is $75.00 for domestic subscribers and $150.00 for subscribers outside the North American continent, except as listed below for *DOE Patents Available for Licensing (PAL)*. A single issue is $7.00 (domestic) and $14.00 (outside the North American continent).

Current Energy Patents (CEP)

A monthly publication providing abstracting and indexing coverage of the international patent literature, including patent applications, that concerns any aspect of energy production, conservation, and utilization. Available as PB83-902800.

DOE Patents Available for Licensing (PAL)

DOE is prepared to grant exclusive or nonexclusive, revocable licenses under DOE-owned U. S. patents and patent applications; this semiannual publication provides abstracting and indexing coverage to this literature. Available as PB83-946800; the annual subscription price is $14.00 (domestic) and $28.00 (foreign).

Energy and the Environment (EAE)

A monthly abstract journal devoted to information on the impacts of energy-related activities and radioactive and nonradioactive pollutants on the environment. Available as PB83-914900.

Fossil Energy Update (FEU)

A monthly abstract journal devoted to information on the processing and use of fossil fuels. Available as PB83-914600.

Fusion Energy Update (CFU)

A monthly abstract journal devoted to information on controlled thermonuclear research. Available as PB83-915300.

Solar Energy Update (SEU)

A monthly abstract journal devoted to information on the utilization of solar energy, including biomass and tidal and wind power. Available as PB83-914500.

The following publications are available from the National Technical Information Service (NTIS), Springfield, Virginia 22161. The annual rate for one volume (calendar) year (24 issues) is $40.00 for domestic subscribers and $80.00 for subscribers outside the North American continent.

Direct Energy Conversion (DEC)

A semimonthly current awareness bulletin covering the following areas: photovoltaics, magnetohydrodynamics, electrohydrodynamics, thermoelectrics, thermionics, and fuel cells. Available as PB83-946600.

Geothermal Energy Technology (GET)

A semimonthly current awareness bulletin devoted to information on the exploration and development of geothermal resources. Available as PB83-914700.

Nuclear Fuel Cycle (NFC)

A semimonthly current awareness bulletin covering all aspects of the nuclear fuel cycle, both front end and back end. Available as PB83-913400.

Nuclear Reactor Safety (NRS)

A semimonthly current awareness bulletin covering the following safety aspects: accident analysis, safety systems, radiation protection, decommissioning and dismantling, and security measures. Available as PB83-913500.

Radioactive Waste Management (RWM)

A semimonthly current awareness bulletin covering the following management aspects: transport and storage, waste processing, waste disposal, waste storage, radioactive effluents, and shipping containers. Available as PB83-902900.

INTERNATIONAL ENERGY PUBLICATIONS

The Technical Information Center cooperates with the following organizations in the publication of international abstract journals: (1) International Atomic Energy Agency, International Nuclear Information System, Vienna, Austria, for *Atomindex;* (2) International Energy Agency, IEA Coal Research, London, England, for *Coal Abstracts;* and (3) International Energy Agency, Biomass Conversion Technical Information Service, Dublin, Ireland, for *Biomass Abstracts.* In each case, the cognizant foreign agency provides the non-U.S. information to TIC for inclusion in the Energy Data Base; in turn, TIC provides the U.S. information for input into the respective journal.

Atomindex

A semimonthly abstract journal providing worldwide coverage of information on nuclear science and technology. *Atomindex* is available by subscription from UNIPUB, 345 Park Avenue South, New York, NY 10010. The cost of an annual subscription, 24 semimonthly issues and semiannual and annual cumulative indexes, is $290.

Biomass Abstracts

A bimonthly abstract journal with comprehensive coverage of information in any step involved in the eventual conversion of biomass to energy. *Biomass Abstracts* is available free to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Biomass Abstracts* from Biomass Conversion Technical Information Service, Institute for Industrial Research and Standards, Ballymun Road, Dublin 9, Ireland, for 42 IR pounds per year. Make checks payable to the Institute.

Coal Abstracts

A monthly abstract journal providing comprehensive worldwide coverage of information in the field of coal science and technology. *Coal Abstracts* is available to Department of Energy components and contractors from the Technical Information Center. Non-DOE organizations may obtain *Coal Abstracts* from IEA Coal Research, Technical Information Service, 14-15 Lower Grosvenor Place, London SW1W 0EX, England, for 100 pounds sterling per year.

International Copyright, © U. S. Department of Energy, 1983, under the provisions of the Universal Copyright Convention. United States copyright is not asserted under the United States Copyright Law, Title 17, United States Code.

energinfo ERA

Vol. 8, No. 18
ISSN: 0160-3604
CODEN: ERABD
September 30, 1983

ENERGY RESEARCH ABSTRACTS

ABOUT THE TECHNICAL INFORMATION CENTER

The Technical Information Center in Oak Ridge, Tennessee, has been the national center for scientific and technical information for the Department of Energy (DOE) and its predecessor agencies since 1946. In developing and managing DOE's technical information program, the Center places under bibliographic control not only DOE-originated information but also worldwide literature on scientific and technical advances in the energy field and announces the source and availability of this information. Whereas the literature of science is emphasized, coverage is extended to DOE programmatic, socioeconomic, environmental, legislative/regulatory, energy analysis, and policy-related areas. To accomplish this mission, the Center builds and maintains computerized energy-information data bases and disseminates this information via computerized retrieval systems and announcement publications such as abstracting journals, bibliographies, and update journals. Direct access to the Center's most comprehensive data base, the Energy Data Base, is available to the public through commercial on-line bibliographic retrieval systems. The Energy Data Base and many of the Center's energy-related data bases are available to DOE offices and contractors and to other government agencies via DOE/RECON, the Department's on-line information retrieval system. The Center has developed and maintains systems to record and communicate energy-related research-in-progress information, to maintain a register of DOE public communications publications, to track research report deliverables from DOE contractors, and to test and make available DOE-funded computer software programs with scientific and management applications. The Center also maintains a full-scale publishing capability to serve special publication needs of the Department. To effectively manage DOE's technical information resources, the Center's program is one of continual development and evaluation of new information products, systems, and technologies.

UNITED STATES DEPARTMENT OF ENERGY

Donald Paul Hodel
Secretary

Martha O. Hesse
Assistant Secretary
Management and Administration

William S. Heffelfinger
Director of Administration

Joseph G. Coyne
Manager
Technical Information Center

ABOUT *ENERGY RESEARCH ABSTRACTS*

Energy Research Abstracts (ERA) provides abstracting and indexing coverage of all scientific and technical reports, journal articles, conference papers and proceedings, books, patents, theses, and monographs originated by the U. S. Department of Energy, its laboratories, energy centers and contractors. *ERA* also covers other energy information prepared *in report form* by federal and state government organizations, foreign governments, and domestic and foreign universities and research organizations. The user should remain aware that *ERA* coverage of non-report literature is limited to that generated by Department of Energy activity.

ERA is comprehensive in its subject scope, encompassing the DOE's research, development, demonstration, and technological programs resulting from its broad charter for energy sources, supplies, safety, environmental impacts, and regulation.

ERA is available on an exchange basis to universities, research institutions, industrial firms, and publishers of scientific information. Inquiries should be directed to the Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830.

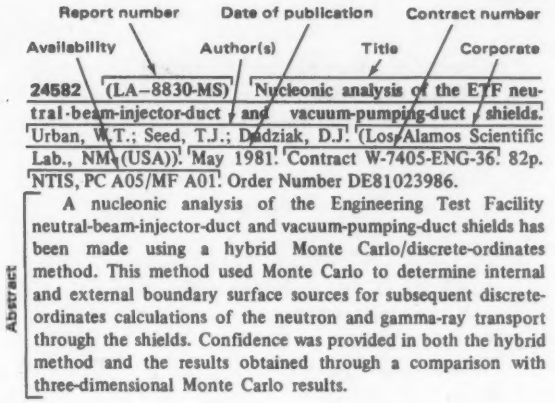
ERA is available to the public on a subscription basis from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. The subscription rate for the 24 semimonthly issues is $165.00 for domestic subscribers and $206.25 for foreign subscribers. A single issue costs $9.50 (domestic) or $11.90 (foreign). The cumulative indexes will be available in printed form from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402, and in microfiche form from the National Technical Information Service, U. S. Department of Commerce, Springfield, Virginia 22161, and from Engineered Systems, P. O. Box 866, Oak Ridge, Tennessee 37830.

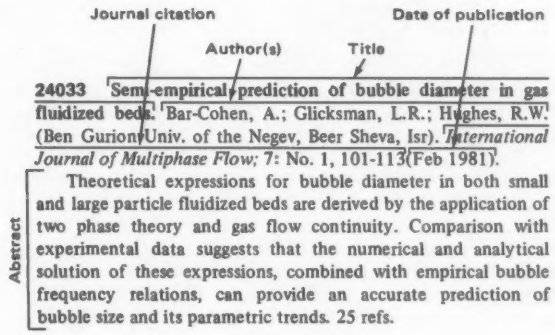
Published by the **United States Department of Energy, Technical Information Center**
P. O. Box 62, Oak Ridge, Tennessee 37830

HOW TO USE *ENERGY RESEARCH ABSTRACTS*

ABSTRACTS IN *ENERGY RESEARCH ABSTRACTS*

The principal elements of abstract entries for a typical research and development report and a typical technical journal article are illustrated below.


Report number
Date of publication
Contract number
Availability
Author(s)
Title
Corporate
24582 (LA–8830-MS) Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields. Urban, W.T.; Seed, T.J.; Dudziak, D.J. (Los Alamos Scientific Lab., NM (USA)). May 1981. Contract W-7405-ENG-36. 82p. NTIS, PC A05/MF A01. Order Number DE81023986.
Abstract
A nucleonic analysis of the Engineering Test Facility neutral-beam-injector-duct and vacuum-pumping-duct shields has been made using a hybrid Monte Carlo/discrete-ordinates method. This method used Monte Carlo to determine internal and external boundary surface sources for subsequent discrete-ordinates calculations of the neutron and gamma-ray transport through the shields. Confidence was provided in both the hybrid method and the results obtained through a comparison with three-dimensional Monte Carlo results.


Journal citation
Date of publication
Author(s)
Title
24033 Semi-empirical prediction of bubble diameter in gas fluidized beds. Bar-Cohen, A.; Glicksman, L.R.; Hughes, R.W. (Ben Gurion Univ. of the Negev, Beer Sheva, Isr). International Journal of Multiphase Flow; 7: No. 1, 101-113 (Feb 1981).
Abstract
Theoretical expressions for bubble diameter in both small and large particle fluidized beds are derived by the application of two phase theory and gas flow continuity. Comparison with experimental data suggests that the numerical and analytical solution of these expressions, combined with empirical bubble frequency relations, can provide an accurate prediction of bubble size and its parametric trends. 25 refs.

INDEXES TO *ENERGY RESEARCH ABSTRACTS*

Five indexes are provided for approaching the contents of each issue of *Energy Research Abstracts (ERA)*. Each index is preceded by an introduction that details the organization of the index and the principles by which it was compiled. The reader is referred to these introductions for information not found in the index examples that follow.

• Corporate Author Index

Technical report literature is indexed using the name of the organization or institution responsible for the issuance of the report.

24582 (LA–8830-MS) Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields. Urban, W.T.; Seed, T.J.; Dudziak, D.J. **(Los Alamos Scientific Lab., NM (USA)).** May 1981. Contract W-7405-ENG-36. 82p. NTIS, PC A05/MF A01. Order Number DE81023986.

is indexed as:

Los Alamos Scientific Lab., NM (USA)
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Personal Author Index

Each author's name is indexed in the form appearing on the document abstracted, with the exception that given names are reduced to initials:

Bar-Cohen, A., Semi-empirical prediction of bubble diameter in gas fluidized beds, 7:24033 (J:US)
Dudziak, D.J., *See* Urban, W.T., 6:24582
Glicksman, L.R., *See* Bar-Cohen, A., 7:24033
Hughes, R.W., *See* Bar-Cohen, A., 7:24033
Seed, T.J., *See* Urban, W.T., 6:24582
Urban, W.T., Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Subject Index

The subject index consisting of entries naming specific materials, objects, and processes is arranged alphabetically. Document titles, informative phrases, or both specific to these entries are arranged alphabetically under the entries.

TOKAMAK ETF
Neutral Atom Beam Injection
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)
Neutron Transport
Nucleonic analysis of the ETF neutral-beam-injector-duct and vacuum-pumping-duct shields, 6:24582 (R:US)

• Contract Number Index

DOE technical literature is indexed using contract numbers under which the literature was produced. This index contains the contract number with corresponding abstract and report numbers.

W-7405-ENG-36	**Los Alamos National Lab., NM (USA)**	
	6:24582	LA–8830-MS

• Report Number Index

Technical report literature is also indexed using report numbers. This index includes information on where individual reports may be obtained. Patents and conference papers are indexed here as a matter of convenience. When a report is supplied under an Order Number, that number is included in the availability statement. An Order Number–Report Number Correlation is included for convenience.

LA–		
8830-MS	6:24582	NTIS, PC A05/MF A01. Order Number DE81023986, Distribution Category STD-20d

STAFF OF ENERGY RESEARCH ABSTRACTS

Editor
David E. Bost

Assistant Editors
Lee M. Thompson
Charles E. Stuber

Nuclear, Engineering, and Physics Research Branch
Chief, Henry D. Raleigh

Technical Specialists
David C. Cunningham, Nuclear Engineering
William H. Kinser, Jr., Physics
Lila Smith, Solar Energy
Lawrence T. Whitehead, Nuclear Physics
Milton O. Whitson, Fusion Energy

Scientific Analysts
Sharon Colclasure
Donald D. Davis
James R. Dulaney
Michael J. Joncich
Dona C. Keller
Mona H. Raridon
George H. Thoeming
Jerry M. Thomas
Larry E. Williams

Chemistry, Materials, and Biological Sciences Branch
Chief, Sidney F. Lanier

Technical Specialists
D. Lamar Cason, Materials and Physical Chemistry
M. Catherine Grissom, Fossil Energy
Lynda H. McLaren, Radio- and Radiation Chemistry

Scientific Analysts
Polly S. Blackburn
Dorothy M. Chertok
Carole K. Keyes
Betty L. McDowell
Lorne T. Newman
Donna G. Powers
Axel C. Ringe
Frances Roddy
David L. Snow
Amy T. Tamura

Subject Heading Specialist
Julia S. Redford

Corporate Author Specialist
Patsy L. Hendricks

Report Number Specialist
Ramona N. Nelson

Contract Number Specialist
William D. Matheny

Cataloging/Digitizing Coordinator
Mary C. Hall

Computer Processing Coordinator
Billy H. Brady

Publishing Coordinator
Irene D. Keller

Communication concerning the editorial policy and content of *Energy Research Abstracts* should be addressed to the Editor, *Energy Research Abstracts*, Technical Information Center, P. O. Box 62, Oak Ridge, Tennessee 37830.

SUBJECT CONTENTS (NUMERICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 294 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope notes is available as DOE/TIC-4584-R4 from NTIS for $7.00.

01 COAL AND COAL PRODUCTS
- 04 Processing
- 05 By-Products
- 06 Properties
- 08 Waste Management
- 09 Environmental Aspects
- 10 Reserves and Exploration
- 20 Mining
- 30 Transport and Handling
- 40 Combustion
- 50 Marketing and Economics
- 60 Health and Safety
- 70 Regulations

02 PETROLEUM
- 01 Reserves
- 02 Geology and Exploration
- 03 Drilling and Production
- 04 Processing
- 05 Products and By-Products
- 06 Health and Safety
- 07 Marketing and Economics
- 08 Waste Management
- 09 Environmental Aspects
- 10 Policy, Legislation, and Regulation
- 20 Transport, Pipelines, and Handling
- 30 Properties
- 40 Storage
- 50 Combustion

03 NATURAL GAS
- 01 Reserves
- 02 Geology and Exploration
- 03 Drilling, Production, and Processing
- 04 Products and By-Products
- 05 Health and Safety
- 06 Marketing and Economics
- 07 Waste Management
- 08 Environmental Effects
- 09 Artificial Stimulation, Plowshare, etc.
- 10 Policy, Legislation, and Regulation
- 20 Transport, Pipelines, and Handling
- 30 Properties
- 40 Combustion
- 50 Storage

04 OIL SHALES AND TAR SANDS
- 01 Reserves and Exploration
- 02 Site Geology and Hydrology
- 03 Drilling, Fracturing, and Mining
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 06 Direct Uses and By-Products
- 07 Health and Safety
- 08 Marketing and Economics
- 09 Waste Research and Management
- 10 Environmental Aspects
- 20 Regulations

05 NUCLEAR FUELS
- 01 Reserves
- 02 Exploration
- 03 Mining
- 04 Feed Processing
- 05 Enrichment
- 06 By-Products
- 07 Fuels Production and Properties
- 08 Spent Fuels Reprocessing
- 09 Transport and Storage
- 10 Marketing and Economics
- 20 Waste Management
- 30 Environmental Aspects
- 40 Health and Safety
- 50 Regulations

06 FUSION FUELS
- 01 Sources
- 02 Processing
- 03 By-Products
- 04 Transport and Storage
- 05 Health and Safety
- 06 Regulations and Policy
- 07 Waste Management
- 08 Properties
- 09 Environmental Aspects

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 01 Physical Isotope Separation
- 02 Radiation Sources
- 03 Isotopic Power Supplies

08 HYDROGEN
- 01 Production
- 02 Storage
- 03 Transport
- 04 Marketing and Economics
- 05 Safety
- 06 Industrial and Commercial Use
- 07 By-Products
- 08 Properties
- 09 Environmental Aspects

09 OTHER SYNTHETIC AND NATURAL FUELS
- 01 Hydrocarbon Fuels
- 02 Alcohol Fuels
- 03 Inorganic Hydrogen Compound Fuels
- 04 Solid Waste Fuels
- 05 Liquid Waste Fuels
- 06 Gaseous Waste Fuels

13 HYDRO ENERGY
- 01 Resources and Availability
- 02 Site Geology and Meteorology
- 03 Plant Design and Operation
- 04 Regulations and Licensing
- 05 Economics and Management
- 06 Environmental Aspects
- 07 Power Conversion Systems

14 SOLAR ENERGY
- 01 Resources and Availability
- 03 Economics
- 04 Environmental, Legal, and Institutional Aspects
- 05 Solar Energy Conversion
- 06 Photovoltaic Power Plants
- 07 Solar Thermal Power Plants
- 08 Ocean Thermal Gradient Power Plants
- 09 Solar Radiation Utilization
- 10 Solar Collectors and Concentrators
- 20 Heat Storage

15 GEOTHERMAL ENERGY
- 01 Resource Status and Assessment
- 02 Geology, Hydrology, and Geothermal Systems
- 03 Geothermal Exploration and Exploration Technology
- 04 Legal and Institutional Aspects

15 GEOTHERMAL ENERGY (CONT.)
- 05 Economic and Financial Aspects
- 06 Environmental Aspects and Waste Disposal
- 07 By-Products
- 08 Geothermal Power Plants
- 09 Geothermal Engineering
- 10 Direct Energy Utilization
- 20 Geothermal Data and Theory

16 TIDAL POWER
- 03 Regulations
- 04 Economics
- 05 Environmental Aspects
- 07 Tidal Power Plants
- 08 Wave Energy Converters

17 WIND ENERGY
- 01 Availability (Climatology)
- 03 Regulations
- 04 Economics
- 05 Environmental Aspects
- 06 Wind Energy Engineering

20 ELECTRIC POWER ENGINEERING
- 01 Power Plants and Power Generation
- 02 Environmental Aspects
- 03 Power Transmission and Distribution

21 NUCLEAR POWER PLANTS
- 01 Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled
- 02 Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled
- 03 Power Reactors, Non-Breeding, Graphite Moderated
- 04 Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated
- 05 Power Reactors, Breeding
- 06 Power Reactors, Auxiliary, Mobile, Package, and Transportable
- 07 Regulation and Licensing
- 08 Economics
- 09 Process Heat Reactors

22 NUCLEAR REACTOR TECHNOLOGY
- 01 Theory and Calculation
- 02 Components and Accessories
- 03 Fuel Elements
- 04 Control Systems
- 05 Environmental Aspects
- 06 Research, Test, and Experimental Reactors
- 07 Plutonium and Isotope Production Reactors
- 08 Propulsion Reactors
- 09 Reactor Safety

25 ENERGY STORAGE
- 01 Magnetic
- 02 Compressed Gas
- 03 Pumped Hydro
- 04 Capacitor Banks
- 05 Flywheels
- 06 Thermal
- 07 Liquefied Gas
- 08 Chemical
- 09 Batteries

29 ENERGY PLANNING AND POLICY
- 01 Energy Analysis and Modeling
- 02 Economics and Sociology
- 03 Environment, Health, and Safety
- 04 Natural Resources
- 05 Research, Development, Demonstration, and Commercialization
- 06 Nuclear Energy
- 07 Transport and Storage
- 08 Waste Heat Utilization
- 10 Conservation
- 20 Supply, Demand, and Forecasting
- 30 Policy, Legislation, and Regulation
- 40 Fossil Fuels
- 50 Hydrogen and Synthetic Fuels
- 60 Electric Power
- 80 Consumption and Utilization
- 90 Unconventional Sources and Power Generation

30 ENERGY CONVERSION
- 01 MHD Generators
- 02 EHD Generators
- 03 Thermoelectric Generators
- 04 Thermionic Converters
- 05 Fuel Cells
- 08 Electromechanical Converters

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
- 01 Buildings
- 02 Transportation
- 03 Industry and Agriculture
- 06 Municipalities and Community Systems
- 09 Education and Public Relations

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS
- 01 Internal Combustion Engines
- 02 External Combustion Engines
- 03 Electric-Powered Systems
- 04 Hybrid Systems
- 05 Flywheel Propulsion
- 06 Vehicle Design Factors
- 07 Emission Control
- 08 Alternative Fuels

36 MATERIALS
- 01 Metals and Alloys
- 02 Ceramics, Cermets, and Refractories
- 03 Composite Materials
- 04 Polymers and Plastics
- 06 Other Materials

40 CHEMISTRY
- 01 Analytical and Separations Chemistry
- 02 Inorganic and Physical Chemistry
- 03 Organic Chemistry
- 04 Electrochemistry
- 05 Photochemistry
- 06 Radiation Chemistry
- 07 Radiochemistry and Nuclear Chemistry
- 08 Combustion Chemistry

42 ENGINEERING
- 01 General Engineering
- 02 Facilities and Equipment
- 03 Lasers
- 04 Heat Transfer and Fluid Flow
- 05 Materials Testing

42 ENGINEERING (CONT.)
- 06 Safety Engineering
- 07 Vacuum Engineering
- 08 Electronic Circuits and Devices
- 09 Waste Processing Plants and Equipment
- 10 Combustion Systems
- 20 Underground Engineering
- 30 Marine Engineering
- 40 Pollution Control Equipment
- 50 Power Cycles

43 PARTICLE ACCELERATORS
- 01 Design, Development, and Operation
- 02 Beam Dynamics, Field Calculations, and Ion Optics
- 03 Auxiliaries and Components
- 04 Storage Rings

44 INSTRUMENTATION
- 01 Radiation Instrumentation
- 02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
- 03 Miscellaneous Instruments
- 04 Well Logging Instrumentation

45 EXPLOSIONS AND EXPLOSIVES
- 01 Chemical
- 02 Nuclear
- 03 Explosion Detection

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 04 Thermal Effluents Monitoring and Transport
- 05 Site Resource and Use Studies
- 06 Regulations

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 04 Thermal Effluents Monitoring and Transport
- 05 Site Resource and Use Studies
- 06 Regulations

52 ENVIRONMENTAL SCIENCES, AQUATIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 04 Thermal Effluents Monitoring and Transport
- 05 Site Resource and Use Studies
- 06 Regulations

53 ENVIRONMENTAL–SOCIAL ASPECTS OF ENERGY TECHNOLOGIES
- 01 Social and Economic Studies
- 02 Assessment of Energy Technologies
- 03 Environmental Impact Statements

55 BIOMEDICAL SCIENCES, BASIC STUDIES
01 Behavioral Biology
02 Biochemistry
03 Cytology
04 Genetics
05 Metabolism
06 Medicine
07 Microbiology
08 Morphology
09 Pathology
10 Physiological Systems
20 Public Health
30 Agriculture and Food Technology

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
01 Radiation Effects
02 Thermal Effects
03 Chemicals Metabolism and Toxicity
04 Other Environmental Pollutant Effects

57 HEALTH AND SAFETY

58 GEOSCIENCES
01 Geology and Hydrology
02 Geophysics
03 Mineralogy, Petrology, and Rock Mechanics
04 Geochemistry
05 Oceanography

64 PHYSICS RESEARCH
01 Astrophysics and Cosmology
02 Atmospheric Physics
03 Atomic, Molecular, and Chemical Physics
04 Fluid Physics
50 High Energy Physics

65 PHYSICS RESEARCH (CONT.)
10 Nuclear Physics
40 Radiation and Shielding Physics
50 Medical Physics
60 Solid State Physics
70 Theoretical Physics
80 Mathematical Physics
90 Communication, Education, History, and Philosophy

70 FUSION ENERGY
01 Plasma Research
02 Fusion Power Plant Technology

99 GENERAL AND MISCELLANEOUS
01 Management
02 Mathematics and Computers
03 Information Handling
04 Law
05 Civilian Defense

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

SUBJECT CONTENTS (ALPHABETICAL LISTING)

Six-digit subject category numbers are used in the storage, retrieval, and manipulation of bibliographic information entered into DOE's computerized bibliographic information system. The six-digit category numbers are utilized as if they were three pairs of two-digit numbers, the first two pairs being used to arrange the abstract content of *Energy Research Abstracts*. The following listing includes the totality of the 40 first-level and 294 second-level subject categories used. Because each issue of *ERA* announces only those documents becoming available during a semimonthly period, some subject categories may not be represented in every issue. The complete subject category scheme with scope notes is available as DOE/TIC-4584-R4 from NTIS for $7.00.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS
- 08 Alternative Fuels
- 03 Electric-Powered Systems
- 07 Emission Control
- 02 External Combustion Engines
- 05 Flywheel Propulsion
- 04 Hybrid Systems
- 01 Internal Combustion Engines
- 06 Vehicle Design Factors

56 BIOMEDICAL SCIENCES, APPLIED STUDIES
- 03 Chemicals Metabolism and Toxicity
- 04 Other Environmental Pollutant Effects
- 01 Radiation Effects
- 02 Thermal Effects

55 BIOMEDICAL SCIENCES, BASIC STUDIES
- 30 Agriculture and Food Technology
- 01 Behavioral Biology
- 02 Biochemistry
- 03 Cytology
- 04 Genetics
- 06 Medicine
- 05 Metabolism
- 07 Microbiology
- 08 Morphology
- 09 Pathology
- 10 Physiological Systems
- 20 Public Health

40 CHEMISTRY
- 01 Analytical and Separations Chemistry
- 08 Combustion Chemistry
- 04 Electrochemistry
- 02 Inorganic and Physical Chemistry
- 03 Organic Chemistry
- 05 Photochemistry
- 06 Radiation Chemistry
- 07 Radiochemistry and Nuclear Chemistry

01 COAL AND COAL PRODUCTS
- 05 By-Products
- 40 Combustion
- 09 Environmental Aspects
- 60 Health and Safety
- 50 Marketing and Economics
- 20 Mining
- 04 Processing
- 06 Properties
- 70 Regulations
- 10 Reserves and Exploration
- 30 Transport and Handling
- 08 Waste Management

20 ELECTRIC POWER ENGINEERING
- 02 Environmental Aspects
- 01 Power Plants and Power Generation
- 03 Power Transmission and Distribution

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION
- 01 Buildings
- 09 Education and Public Relations
- 03 Industry and Agriculture
- 06 Municipalities and Community Systems
- 02 Transportation

30 ENERGY CONVERSION
- 02 EHD Generators
- 08 Electromechanical Converters
- 05 Fuel Cells
- 01 MHD Generators
- 04 Thermionic Converters
- 03 Thermoelectric Generators

29 ENERGY PLANNING AND POLICY
- 10 Conservation
- 80 Consumption and Utilization
- 02 Economics and Sociology
- 60 Electric Power
- 01 Energy Analysis and Modeling
- 03 Environment, Health, and Safety
- 40 Fossil Fuels
- 50 Hydrogen and Synthetic Fuels
- 04 Natural Resources
- 06 Nuclear Energy
- 30 Policy, Legislation, and Regulation
- 05 Research, Development, Demonstration, and Commercialization
- 20 Supply, Demand, and Forecasting
- 07 Transport and Storage
- 90 Unconventional Sources and Power Generation
- 08 Waste Heat Utilization

25 ENERGY STORAGE
- 09 Batteries
- 04 Capacitor Banks
- 08 Chemical
- 02 Compressed Gas
- 05 Flywheels
- 07 Liquefied Gas
- 01 Magnetic
- 03 Pumped Hydro
- 06 Thermal

42 ENGINEERING
- 10 Combustion Systems
- 08 Electronic Circuits and Devices
- 02 Facilities and Equipment
- 01 General Engineering
- 04 Heat Transfer and Fluid Flow
- 03 Lasers
- 30 Marine Engineering
- 05 Materials Testing
- 40 Pollution Control Equipment
- 50 Power Cycles
- 06 Safety Engineering
- 20 Underground Engineering
- 07 Vacuum Engineering
- 09 Waste Processing Plants and Equipment

52 ENVIRONMENTAL SCIENCES, AQUATIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL
- 01 Basic Studies
- 02 Chemicals Monitoring and Transport
- 03 Radioactive Materials Monitoring and Transport
- 06 Regulations
- 05 Site Resource and Use Studies
- 04 Thermal Effluents Monitoring and Transport

53 ENVIRONMENTAL–SOCIAL ASPECTS OF ENERGY TECHNOLOGIES
- 02 Assessment of Energy Technologies
- 03 Environmental Impact Statements
- 01 Social and Economic Studies

45 EXPLOSIONS AND EXPLOSIVES
- 01 Chemical
- 03 Explosion Detection
- 02 Nuclear

70 FUSION ENERGY
- 02 Fusion Power Plant Technology
- 01 Plasma Research

06 FUSION FUELS
- 03 By-Products
- 09 Environmental Aspects
- 05 Health and Safety
- 02 Processing
- 08 Properties
- 06 Regulations and Policy
- 01 Sources
- 04 Transport and Storage
- 07 Waste Management

99 GENERAL AND MISCELLANEOUS
- 05 Civilian Defense
- 03 Information Handling
- 04 Law
- 01 Management
- 02 Mathematics and Computers

58 GEOSCIENCES
- 04 Geochemistry
- 01 Geology and Hydrology
- 02 Geophysics
- 03 Mineralogy, Petrology, and Rock Mechanics
- 05 Oceanography

15 GEOTHERMAL ENERGY
- 07 By-Products
- 10 Direct Energy Utilization
- 05 Economic and Financial Aspects
- 06 Environmental Aspects and Waste Disposal
- 02 Geology, Hydrology, and Geothermal Systems
- 20 Geothermal Data and Theory
- 09 Geothermal Engineering
- 03 Geothermal Exploration and Exploration Technology
- 08 Geothermal Power Plants
- 04 Legal and Institutional Aspects
- 01 Resource Status and Assessment

57 HEALTH AND SAFETY

13 HYDRO ENERGY
- 05 Economics and Management
- 06 Environmental Aspects
- 03 Plant Design and Operation
- 07 Power Conversion Systems
- 04 Regulations and Licensing
- 01 Resources and Availability
- 02 Site Geology and Meteorology

08 HYDROGEN
- 07 By-Products
- 09 Environmental Aspects
- 06 Industrial and Commercial Use
- 04 Marketing and Economics
- 01 Production
- 08 Properties
- 05 Safety
- 02 Storage
- 03 Transport

44 INSTRUMENTATION
- 03 Miscellaneous Instruments
- 02 Radiation Effects on Instrument Components, Instruments, or Electronic Systems
- 01 Radiation Instrumentation
- 04 Well Logging Instrumentation

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY
- 03 Isotopic Power Supplies
- 01 Physical Isotope Separation
- 02 Radiation Sources

36 MATERIALS
- 02 Ceramics, Cermets, and Refractories
- 03 Composite Materials
- 01 Metals and Alloys
- 06 Other Materials
- 04 Polymers and Plastics

03 NATURAL GAS
- 09 Artificial Stimulation, Plowshare, etc.
- 40 Combustion
- 03 Drilling, Production, and Processing
- 08 Environmental Effects
- 02 Geology and Exploration
- 05 Health and Safety
- 06 Marketing and Economics
- 10 Policy, Legislation, and Regulation
- 04 Products and By-Products
- 30 Properties
- 01 Reserves
- 50 Storage
- 20 Transport, Pipelines, and Handling
- 07 Waste Management

05 NUCLEAR FUELS
- 06 By-Products
- 05 Enrichment
- 30 Environmental Aspects
- 02 Exploration
- 04 Feed Processing
- 07 Fuels Production and Properties
- 40 Health and Safety
- 10 Marketing and Economics
- 03 Mining
- 50 Regulations
- 01 Reserves
- 08 Spent Fuels Reprocessing
- 09 Transport and Storage
- 20 Waste Management

21 NUCLEAR POWER PLANTS
- 08 Economics
- 06 Power Reactors, Auxiliary, Mobile, Package, and Transportable
- 05 Power Reactors, Breeding
- 03 Power Reactors, Non-Breeding, Graphite Moderated
- 01 Power Reactors, Non-Breeding, Light-Water Moderated, Boiling Water Cooled
- 02 Power Reactors, Non-Breeding, Light-Water Moderated, Non-Boiling Water Cooled
- 04 Power Reactors, Non-Breeding, Otherwise Moderated or Unmoderated
- 09 Process Heat Reactors
- 07 Regulation and Licensing

22 NUCLEAR REACTOR TECHNOLOGY
- 02 Components and Accessories
- 04 Control Systems
- 05 Environmental Aspects
- 03 Fuel Elements
- 07 Plutonium and Isotope Production Reactors
- 08 Propulsion Reactors
- 09 Reactor Safety
- 06 Research, Test, and Experimental Reactors
- 01 Theory and Calculation

04 OIL SHALES AND TAR SANDS
- 06 Direct Uses and By-Products
- 03 Drilling, Fracturing, and Mining
- 10 Environmental Aspects
- 07 Health and Safety
- 08 Marketing and Economics
- 04 Oil Production, Recovery, and Refining
- 05 Properties and Composition
- 20 Regulations
- 01 Reserves and Exploration
- 02 Site Geology and Hydrology
- 09 Waste Research and Management

09 OTHER SYNTHETIC AND NATURAL FUELS
- 02 Alcohol Fuels
- 06 Gaseous Waste Fuels
- 01 Hydrocarbon Fuels
- 03 Inorganic Hydrogen Compound Fuels
- 05 Liquid Waste Fuels
- 04 Solid Waste Fuels

43 PARTICLE ACCELERATORS
- 03 Auxiliaries and Components
- 02 Beam Dynamics, Field Calculations, and Ion Optics
- 01 Design, Development, and Operation
- 04 Storage Rings

02 PETROLEUM
- 50 Combustion
- 03 Drilling and Production
- 09 Environmental Aspects
- 02 Geology and Exploration
- 06 Health and Safety
- 07 Marketing and Economics
- 10 Policy, Legislation, and Regulation
- 04 Processing
- 05 Products and By-Products
- 30 Properties
- 01 Reserves
- 40 Storage
- 20 Transport, Pipelines, and Handling
- 08 Waste Management

64 PHYSICS RESEARCH
- 01 Astrophysics and Cosmology
- 02 Atmospheric Physics
- 03 Atomic, Molecular, and Chemical Physics
- 04 Fluid Physics
- 50 High Energy Physics

65 PHYSICS RESEARCH (CONT.)
- 90 Communication, Education, History, and Philosophy
- 80 Mathematical Physics
- 50 Medical Physics
- 10 Nuclear Physics
- 40 Radiation and Shielding Physics
- 60 Solid State Physics
- 70 Theoretical Physics

14 SOLAR ENERGY
- 03 Economics
- 04 Environmental, Legal, and Institutional Aspects
- 20 Heat Storage
- 08 Ocean Thermal Gradient Power Plants
- 06 Photovoltaic Power Plants
- 01 Resources and Availability
- 10 Solar Collectors and Concentrators
- 05 Solar Energy Conversion
- 09 Solar Radiation Utilization
- 07 Solar Thermal Power Plants

16 TIDAL POWER
- 04 Economics
- 05 Environmental Aspects
- 03 Regulations
- 07 Tidal Power Plants
- 08 Wave Energy Converters

17 WIND ENERGY
- 01 Availability (Climatology)
- 04 Economics
- 05 Environmental Aspects
- 03 Regulations
- 06 Wind Energy Engineering

CORPORATE AUTHOR INDEX

PERSONAL AUTHOR INDEX

SUBJECT INDEX

CONTRACT NUMBER INDEX

REPORT NUMBER INDEX

ORDER NUMBER CORRELATION

ENERGY RESEARCH ABSTRACTS

01 COAL AND COAL PRODUCTS

0104 Processing

REFER ALSO TO CITATION(S) 43190, 43217, 43219, 43221, 43225, 43226, 43228, 43229, 43230, 43231, 43232, 43233, 43234, 43235, 43236, 43237, 43238, 43239, 43240, 43240, 43240, 43243, 43263, 43267, 43268, 43268, 43423, 43424, 43448, 43449, 43541, 43730, 44013, 44651

43146 (BMFT-FB-T—82-203) Development of a continuous feeding system for coal dust pressure gasification. Pontow, B.; Strecker, J.; Wiedmann, W. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 85p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750207.

Portions are illegible in microfiche products.

1. The most important feeding systems tested in pilot plants for coal gasification up to now are a discontinuous lock hopper system in connection with a pneumatic feeding and continuous coal-water-slurry-feeding using pumps. 2. It was the aim of this project to develop a continuous feeding system for solid dust material with a minimum content of water and inert gas into pressurized gasification reactors. 3. At first the data required for the design of a pilot plant were determined by bench scale tests at atmospheric pressure. After design and construction of the pilot plant the operating behaviour and the specific energy consumption of the feeding systems were determined by changing the operating parameters. Extensive feeding tests were run with reactor pressure up to 60 bar. Finally gasification tests under pressure have been performed. 4. There are no problems operating the new system under gasification conditions. The minimum content of water could be reduced to 14 wt.% 5. Prior to commercial application further tests for optimization the new feeding system are necessary. Subsequently to these tests the new feeding system can be used for all entrained bed and fluidized bed gasification processes.

43147 (BMFT-FB-T—83-038) Project study of prototype plant for the VEW-coal-conversion-process (pressure operation). Deggim, D.; Heep, D. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 28p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751035.

Portions are illegible in microfiche products.

A developed coal feeding and metering system which consists mainly of a rotary star valve was tested under conditions of entrained coal gasification with an operation pressure of 25 bar. The system has shown a good exactness of metering the coal without influence of changing pressure as can be caused by the operation of entrained gasifiers. In the next step this system is provided to be applied to a 10 t/h prototype plant of VEW-Coal-Conversion-Process operating under 24 bar.

43148 (CONF-8208141—) Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings. Warren-Couch, K. (ed.). (Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering; USDOE Pittsburgh Energy Technology Center, PA). 1982. 551p. NTIS, PC A24/MF A01. Order Number DE83012243.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

Portions are illegible in microfiche products.

The ninth annual international conference on coal gasification, liquefaction and conversion to electricity was held August 3-5, 1982. It was sponsored by the Department of Chemical and Petroleum Engineering, University of Pittsburgh, Pittsburgh, Pennsylvania and the Department of Energy, Pittsburgh Energy Technology Center, Pittsburgh, Pennsylvania. Twenty-seven papers from the proceedings have been entered individually into EDB and ERA; two were also entered into EAPA. (LTN)

43149 (CONF-8208141—, pp 1-10) US Synthetic Fuels Corporation overview. (US Synthetic Fuels Corp., Washington DC). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The Synthetic Fuels Corporation requested proposals: sixty-three original proposals were received in the first solicitation and 28 provided additional information requested; five survived maturity and strength evaluations; negotiations are going on with two (Hampshire and Breckinridge); three have been put in the second solicitation. Thirty-five proposals were received in the second solicitation, which the staff are evaluating. The board has earmarked up to $10 billion to aid the development of a private synthetic fuel industry. The board's staff analysis concluded that: (1) western oil shale and the national coal resources are the critical resources for establishing the nation's capability to expand synthetic fuels production to a large scale for the long run; (2) tar sands/heavy oil resources offer the potential for significant commercial production in the short run even though their longer-term contribution may be limited relative to oil shale and coal; and (3) initial commercial production experience with a few generic resource/technology combinations using these high priority resources would do much to enhance national security by improving the capability for synthetic fuels production in both the short and long run. The staff presented four programmatic options for the board's consideration, each consistent with the results of the analysis. The staff recommended and the board approved the idea that approximately two-thirds of the corporation's available obligational authority be earmarked for the three priority resources of oil shale, coal, and tar sands/heavy oil. The estimated amounts, approved by the board, are available to assist projects and advance the corporation's objectives under the first and second general solicitations, the third or programmatic solicitation, and subsequent solicitations.

43150 (CONF-8208141—, pp 217-239) SRC-I technology and its economics. Tao, J.C.; Jones, J.P. III. (International Coal Refining Co., Allentown, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The results of commercial plant economic analysis indicate that the SRC-I technology is economically viable in the long-term. To achieve commercialization by the mid-1990s, it is necessary to proceed with the design, construction, and operation of the demonstration plant to prove the technical feasibility, economic viability, and environmental acceptability of the SRC-I technology. Today, synthetic fuels development no longer holds the urgency that elevated it to a position of national prominence a few years ago. However, most analysts agree that the underlying circumstances that will determine the US energy future are unchanged. The risks inherent in the pioneer development of synthetic fuels technologies, as well as the unpredictable fluctuations in energy supplies, point toward the necessity for continued government involvement as a risk-sharing partner in synthetic fuels development, now and in the future. In recent months, this reality has been underscored by the withdrawal from the field of major industrial partners who have concluded that the risks are too large to be borne by the private sector alone. We at ICRC continue to believe that the development

of a domestic synthetic fuels industry is an inevitable reality for the United States in the near- and long-term. We also continue to believe that accelerated development of this industy - beginning now and continuing at a determined pace during the next decade - is a responsibility that must be shared by the federal government and the private sector working in partnership. Only through such a partnership can we guarantee a reliable source of vital energy products for present and future generations.

43151 (CONF-8208141—, pp 240-264) **Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG.** Duerrfeld, R. (Ruhrkohle Oel und Gas GmbH, Holten, Germany); Langhoff, J.; Toelle, R.; Cornils, B.; Hibbel, J.; Ruprecht, P. 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The demonstration plant of Ruhrkohle/Ruhrchemie in Holten has been on stream over a period of four years. The project targets - process optimizing and development and testing of components - were achieved. Ruhrkohle/Ruhrchemie are planning now a commercial scale gasification plant using the obtained scale-up data. It is intended to continue operating the demonstration plant to test the application of the Texaco technology to the gasification of residues of coal liquefaction processes. Several items are discussed in detail: fuel feeding systems, process selection, tests on 12 different coals, feed slurry preparation, burners, refractories, waste heat recovery, environmental protection and process evaluation for commercialization. The article also discusses the relatively low reserves of oil and natural gas and high consumption rates (for both FRG and the world) as compared to the same factors for coal. A graph shows the volume and cost of crude oil and petroleum products imported into FRG from 1973 to 1981 by year. (LTN)

43152 (CONF-8208141—, pp 265-285) **RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification.** Langhoff, J. (Ruhrkohle Oel und Gas GmbH, Bottrop, Germany) Schaefer, W.; Lohmann, C.; Peyrer, H. 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

In pilot plant runs non-caking to weakly caking bituminous coals have been gasified under varying conditions at pressures of up 100 bar. The high pressure gave rise to no problems. All the theoretically anticipated, pressure-dependent improvements regarding the production of SNG were confirmed: The CH_4 content in the raw gas rises from 10% at 25 bar to over 17% at 90 bar; accordingly there is also a rise in the heating value; the formation of tar and oil declines with growing pressure; the degree of efficiency in terms of the energy fixed chemically in the raw gas increases, while the overall gasification process runs more favorable in terms of energy; and with low steam-oxygen ratio it is likewise more favorable to manage the process in terms of energy, moreover, the degree of steam decomposition increases. Correlations between the most important parameters of the fixed bed gasification process have thus been mostly determined. Further tests will be needed to obtain results on: the widening of the coal spectrum in the direction of using higher-caking coal; the determination of the upper load limit; and the processing of coal fines in a compacted form.

43153 (CONF-8208141—, pp 294-355) **Kentucky coal tests in a commercial Lurgi gasifier.** Jones, J.E. Jr. (Kentucky Department of Energy, Lexington); Roeger, A. III. 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

A commercial scale gasification test on Kentucky 9 coal was conducted in a Lurgi Mark IV dry-bottom gasifier at the Sasol One Plant. The test was conducted to confirm the operability of the Lurgi process on Western Kentucky coal, and to confirm and modify, if necessary, the preliminary design basis for the Tri-State Synfuels Project. The program included coal selection, characterization and shipping, gasification, by-product characterization, wastewater treatability and long term stockpile tests. The testing program defined the technological aspects and determined the coal-related technical and environmental design criteria not only in the areas of gasification but also coal selection, preparation and handling, stripped gas liquor cleanup, fines combustion and long term storage. A wide range of other Illinois Basin coals has been characterized and ranked during the supplemental testing program to evaluate more coals suitable to evaluate more coals suitable for the Tri-State Synfuels Project. The results confirmed that medium swelling and caking Illinois Basin coal can be successfully gasified at commercially acceptable loads. The tests demonstrated that the Lurgi gasifier requires coarse-screened coal with no more than three percent fines. Since Illinois Basin run-of-mine coals typically contain more fines than the Lurgi gasifier can accept and the steam generation facilities require, an excess of fines will exist and must be disposed of by other means. Dusty tar recycle has been demonstrated and is an essential requirement of the process. The tests have confirmed that the design basis for the Tri-State Project used by Lurgi is sound and information has been obtained on which Lurgi would be able to provide process guarantees for a plant to gasify Kentucky 9 and similar coal in coarse-screened form.

43154 (CONF-8208141—, pp 356-377) **Exxon catalytic coal gasification process and large pilot plant development program.** Marshall, H.A. (Exxon Research and Engineering Co., Florham Park, NJ); Smits, F.C.R.M. 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The objective of this paper is to describe a unique process for the conversion of coal to substitute natural gas (SNG), recent development activities, and plans to bring the process to commercial readiness by constructing and operating a large pilot plant. The process is called Catalytic Coal Gasification, or CCG. The fundamental reaction in coal gasification, the reaction of carbon with steam to form a mixture of carbon monoxide and hydrogen, is highly endothermic, requiring the addition of 64 kcal of that for each 2 moles of carbon. The shift reaction is slightly exothermic, releasing 8 kcal of heat for each mole of carbon monoxide shifted. The methanation reaction, however, is highly exothermic, releasing 54 kcal for each mole of methane formed. The overall reaction is slightly endothermic and required very little heat input. It is clearly beneficial to carry out gasification, shift, and methanation in a single reactor, rather than in three separate reactors as in most coal gasification processes. The overall reaction can be made to take place in a single reactor by recycling the carbon monoxide and hydrogen. Exxon's research has confirmed that commercially acceptable gasification rates can be obtained at a temperature of 1300°F using a catalyst, versus temperatures of 1700 to 1800°F without a catalyst. The discovery that this same catalyst system also promotes the methanation reaction is relatively new and is essential to the Exxon CCG process. The ability of the catalyzed char to promote methanation is the key to the CCG process, since it allows a one-reactor process to use directly the heat released in methanation to balance the heat requirement for coal gasification.

43155 (CONF-8208141—, pp 396-415) **First experiences and results of the 200 T/D pilot plant Bottrop.** Langhoff, J. (Ruhrkohle Oel und Gas GmbH, Bottrop, Germany); Wolowski, E.; Tamm, H.F.; Escher, G.; Hosang, H.; Schmedeshagen, B. 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

In a joint project with a 60% participation of RUHRKOHLE AG and a 40% participation of VEBA OEL AG, the largest European pilot plant for coal hydrogenation with a capacity of 200 t/d was erected in Bottrop. The aim of the trial operation is the optimization of GERMAN TECHNOLOGY (modified Bergius/Pier process) and its further development towards commercial feasibility. The Bottrop COAL OIL plant is designed for a throughput of 200 t (waf) hard coal per day, which are converted into hydrogen gases (C_1 to C_4), approximately 30 tons of light oil (C_5 to 200°C), and approximately 70 tons of medium oil (200 to 325°C) (Table 1).

43156 (CONF-8208141—, pp 416-426) **Coal liquefaction technology development in NEDO.** Ogisu, Y. (New Energy Development Organization, Tokyo, Japan). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

In Japan research on coal liquefaction was carried on a little during and after the World War 2nd. But it stopped for a long time. In 1974 Sunshine Project was started by MITI in which research programs on liquefaction and gasification of coal, solar energy and geothermal energy were included. The Sunshine Project is intended to develop new clean energy production technology excepting petroleum and nuclear power. It is the first long term technology development project in Japan and coal liquefaction technology is an important part of it. Three coal liquefaction processes, Extractive Coal Liquefaction, Direct Hydrogenation and Solvolysis Coal Liquefaction, were taken up at first. Later an Australian Brown Coal Liquefaction Project was added. These projects are commissioned to the contracted company and at present the whole research cost is supported by the government. NEDO was established in October 1980 according to a special law to promote the general development of technology for the purpose of commercializing alternative energy resources. NEDO has succeeded the Sunshine Project and has been promoting the projects more intensively. NEDO is not only an administrative organization, but evaluates technical policy for process development and leads the contractors to get the better results. As our purpose is commercialization of coal liquefaction, we intend to develop the more economical processes in-development in other countries. In addition to this, NEDO is developing the new material for high pressure and high temperature vessel and the computer program for the total system analysis of coal liquefaction.

43157 (CONF-8208141—, pp 427-465) **Logic, technology and effect of coal liquefaction conditions on final up-graded product slate.** Smith, M.R.; Hubbard, D.A.; Yang, C.C. (Kellogg-Rust Synfuels, Inc., Houston, TX). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

Direct coal liquefaction has rapidly approached the status of commercial reality. New processes, such as H-Coal, SRC, and Exxon Donor Solvent, offer advantages over indirect liquefaction routes. These advantages, primarily in improved carbon utilization, are gained by employment of a more-complex processing scheme which in turn tends to increase cost of a practically-sized facility. The design of commercial plants using direct coal liquefaction involves a thorough understanding of the strengths and limitations of the several technologies involved. Planning of the overall design requires comparative studies of the individual process options and of the sequences in which they could be applied. Conditions chosen for the coal liquefaction reactor and for the deashing step determine the nature of the syncrude intermediate product. In the succeeding upgrading steps, this syncrude must be converted to salable products. A logical sequence is proposed to establish the overall process configuration, where hydrocracking, hydrotreatment and other refining steps are integrated with the initial conversion units and the hydrogen generation system. Relation of hydrogen consumption to product distribution and product H/C ratio, sulfur, oxygen, and nitrogen content will be developed. Merits of two-state vs. single-stage coal conversion and various ash removal methods are also discussed. A review of published data on upgrading of raw coal liquids is included. Production of salable gasoline, jet fuel, diesel oil, and fuel oils from coal liquids is compared to similar data starting with shale oil, petroleum, and tar sands. Processes employed are hydrocracking, hydrotreatment, catalytic reforming, and catalytic cracking. Delayed or Fluid Coking plus hydrotreating are proposed for processing shale oils and tar sands.

43158 (CONF-8208141—, pp 522-536) **Business criteria for coal gasification.** Anderson, J.M. (PPG Industries, Inc., Pittsburgh, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

There are still some exciting potentials for coal gasification, even under today's economic conditions. However, these potentials cannot be realized without the demonstrated successful operation of prototype facilities of several technologies. We have a breather before many projects will be authorized, and we should use this opportunity to gain the experience needed to successfully build and operate a major new plant. In summary, before significant coal gasification industry can be launched the following events will have to occur: (1) enough prototype units must have operated to give the owner a choice between several gasifiers; (2) these prototype units must have operated long enough to experience the normal difficulties of a new plant and to have overcome the difficulties. The local communities near these units must have accepted them as satisfactory industrial neighbors; (3) enough test marketing must have been completed to uncover any problems in the distribution and use of methanol or medium or low Btu gas; (4) several combinations of coal gasifiers and combined cycle power systems should have attained sustained operation; and (5) the gasification by-products should have been characterized and the protocols for handling and using these materials should be established. Permitting should be a formality which is no different from meeting other code requirements. I contend that we are fortunate that the need for synfuels plants is not as urgent as we all thought a few years ago. The only way that some of the projects being considered then would have paid off is if the price of oil and gas would have continued to escalate. Oil and gas are still depleting, however, and the day of synfuels is not so distant that work is not needed now.

43159 (CONF-8208141—, pp 537-549) **Joint Westinghouse/SASOL commercial-scale fluidized-bed coal gasification project.** Salvador, L.A. (Westinghouse Electric Corp., Madison, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

SASOL Ltd. and Westinghouse Electric Corporation have jointly undertaken a project to demonstrate on a commercial scale the pressurized, ash-agglomerating, fluidized-bed gasification process developed by Westinghouse. The nominal 1200-metric-ton-per-day demonstration plant will be built and operated at the SASOL Two coal-to-synthetic-fuels complex at Secunda. The commercial demonstration is the last step in a structured scale-up program implemented by Westinghouse, starting with laboratory-scale experiments and proceeding through the pilot plant stage and the large cold flow model stage to the present demonstration plant. When demonstrated, the technology could offer unique advantages for future synthetic fuel plants, including gasification of fine coal, with operational safety and minimal environmental impact. A summary of the design conditions for the unit to be built at SASOL Two illustrates its performance advantages as a producer of synthesis gas: it can utilize fine-sized, run-of-mine coal of widely differing ash characteristics, reactivities and sulfur contents; it produces little to no tars, oils or liquid hydrocarbons as by-products, simplifying gas cleaning operations; it produces a granular, dry ash product that can be used as a safe, non-leaching landfill or as a construction material; its low use of steam, moderate use of oxygen, moderate operating temperature, high carbon utilization and use of waste heat make it an efficient and economical process; it is a simple, safe and controllable process with considerable operating range and flexibility because of its large carbon inventory; and its use of carbon steel components, with minimum exotic or high technology materials, provides a reasonable capital cost.

43160 (CONF-8208141—, pp 550-556) **Challenges that remain: can synfuel technology make it on the outside.** Eigerman, M.R. (SEMCOR, Inc., Lakewood, OH). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

Pragmatically, since a synthetic fuel industry can be no more successful than its component facilities, it is critically important that we recognize and use those three types of success criteria as the key determinants of viability for each project individually. That is, each facility proposed, regardless of its size or process characteristics, must meet tests of technical feasibility, economic soundness,

and environmental acceptability or it will be a failure - unable to satisfy the performance expectations of its owners and designers or, worse still, an expensive stillbirth. Conversely, successful projects will be the offspring of scrupulous attention to the dynamics of process, to the flow of dollars invested and returned, and to the consistency and timeliness of compliance with legal requirements for the protection of the public's welfare. There is nothing new in this; all three legs of the triangle - hardware, economics, and environment - are accepted by every serious developer as necessary foundations for the project structure.

43161 (CSS/CI—83-06) Coal pyrolysis under rapid heating with a c-w laser. Gat, N.; Cohen, L.M.; Witte, A.B.; Denison, M.R. (TRW Defense and Space Systems Group, Redondo Beach, CA (USA). Fluid Thermochemistry Dept.). 1983. Contract AC22-81PC40273;AC01-79ER10029. 11p. (CONF-830358—23). NTIS MF A01. Order Number DE83013389.

From Spring meeting of the Central States Section of the Combustion Institute; Lexington, KY, USA (21 Mar 1983).

Microfiche only, copy does not permit paper copy reproduction.

A laser pyrolysis technique for assessing the influence of rapid heating on volatile release from pulverized coal described. Coal particles entrained in an inert gas jet are being irradiated from two opposing directions by a c-w, hf chemical laser beam, providing energy flux up to 2.2 kW/cm^2. Particle temperature as a function of position in the beam is measured using a novel scanning three-color pyrometer operating at 0.8, 0.95 and 1.1 μm. Data are reduced in near real time on a MINC minicomputer utilizing a nonlinear least square fit to a gray body radiation curve. Particle velocity is obtained from LDV measurements. Heating rates between 10^5 to 10^6 K/sec with asymptotic particle temperature between 2000 to 2900 K were measured. The evolution of volatile release during the heating of the particles was observed for residence times between 1 to 20 msec. An added 0.5% tungsten carbide powder was used to evaluate the mass balance obtained from natural tracers such as Ti. It was found that some degree of vaporization of all the ash elements exists and that the natural mineral matter could not serve as a reliable reference for mass balance determination. The experimental data was reduced to yield global kinetic rate constants.

43162 (DOE/ET/10204—1401) Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report. Darling, S.L.; Koucky, R.W.; Tanca, M.C. (Combustion Engineering, Inc., Windsor, CT (USA)). Apr 1983. Contract AC01-76ET10204. 369p. NTIS, PC A16/MF A01. Order Number DE83013060.

Portions are illegible in microfiche products.

A program was conducted to design, construct and operate a two-stage, atmospheric-pressure, entrained-flow, low-Btu coal-gasification process-development unit (PDU) having a capacity of 5 tons/h of coal. The program was jointly sponsored by the US Department of Energy, the Electric Power Research Institute, and Combustion Engineering, Inc. The objectives of the program were: (1) to demonstrate the capability and suitability of the process and equipment to produce a clean, low-Btu gas from coal, and (2) to provide design information for scale-up to commercial-size plants. During the 3-y PDU test program, beginning in June 1978, a series of 12 runs was conducted. Pittsburgh seam coal was fired for 5085 h and clean fuel gas was produced for 3746 h. Also, coal was fired for 250 h during shakedown, which began in December 1977. Product-gas higher heating values above 100 Btu/scf were observed during initial testing when gasifier thick-wall refractory was intact. However, refractory thickness decreased, causing higher vessel heat absorption and hence lower gas temperatures. Lower-than-design gasification kinetics for Pittsburgh-seam-coal char and higher-than-design vessel heat absorption resulted in lower char-gasification rates and decreased gas-heating values. As a result, when the gasifier was operated at the design feed rate of 10,000 lb/h, char inventory was not in balance and gas-heating values were generally less than 100 Btu/scf. Several equipment and operating problems were identified, including refractory durability, char-feed-system limitations and slag tap blockage. A mathematical model was developed to provide a basis for scale-up to commercial-size gasifiers. The model was calibrated using experimental data from the PDU tests and bench-scale support studies. The major process concepts and gasifier design features were demonstrated in tests at reduced coal feed rates. 66 figures, 55 tables.

43163 (DOE/ET/10617—T1) Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979. Li, K.; Rogan, F.H.; Yen, J.H.; Huang, C.S.; Spencer, J.L. (Carnegie-Mellon Univ., Pittsburgh, PA (USA)). Jun 1980. Contract AC01-76ET10617. 110p. (FE—2408-14). NTIS, PC A06/MF A01. Order Number DE83015348.

The kinetics and structural changes of the basic reactions - half-calcination, sulfidation and carbonation - involved in the cyclic use of dolomite for hot-gas desulfurization were investigated over wide ranges of experimental conditions including the origin of dolomite, pellet size and method of pretreatment. Kinetic data were collected for samples of spherical pellets in a high-temperature/high-pressure thermogravimetric analysis system specifically designed and constructed for this study. Solid-phase structures at various stages of each reaction were analyzed by optical and scanning electron microscopy, energy-dispersive x-ray analysis, nitrogen adsorption, and mercury porosimetry. Based on the kinetic and structural data for each reaction, models were developed and mathematically formulated. Agreement between model and experiment in all cases is generally good. Cyclic experiments of the sulfidation of half-calcined dolomite and the carbonation of sulfided dolomite were also performed. The adsorption capacity of dolomite for hydrogen sulfide was found to decrease at first and remain approximately constant upon continued cycling. However, a 75% utilization of calcium atoms in the dolomite was shown to be possible under certain selected conditions. 33 figures, 4 tables.

43164 (DOE/ET/14882—1412) Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982. Walker, P.L. Jr.; Jenkins, R.G.; Vastola, F.J.; Spackman, W. (Pennsylvania State Univ., University Park (USA). Coal Research Section). Jan 1983. Contract AC01-79ET14882. 304p. NTIS, PC A14/MF A01. Order Number DE83012279.

This research was divided into three main tasks. The major objective of each task was as follows: (1) to study pyrolysis and gasification of as-received and pretreated coals following their rapid heating to and short contact times at maximum temperature in N_2, steam, and syngas atmospheres by following weight loss and change in physical properties of the chars; (2) to measure continuously the major gases produced during the isothermal pyrolysis and gasification of as-received and pretreated coals in high pressure steam following their rapid heating to maximum temperature; and (3) to measure the catalytic activity of inorganic constituents in chars derived from as-received and pretreated coals for the concurrent methanation and hydrogasification reactions. Pyrolysis and gasification under Task 1 were followed in vertical isothermal, laminar flow furnaces at temperatures up to 1173 K and at pressures between 0.1 and 3.4 MPa. An extensive mathematical model was developed and tested, describing the time/temperature history of coal particles as they passed through the furnaces. Pyrolysis and gasification under Task 2 was achieved by injecting coal particles into a micro isothermal horizontal flow reactor. With the particles remaining stationary in the reactor, reactions were followed by monitoring products CO, CO_2, and CH_4 using nondispersive infrared (ir) gas analyzers. In Task 3, reactivities of coal chars in 0.1 MPa of various flowing atmospheres were measured in a vertical thermogravimetric system. Product CH_4 was measured by a nondispersive ir gas anlyzer. Results, in particular, show that the presence of exchangeable cations in lignites greatly affects weight loss and composition of volatile products during pyrolysis and subsequent reactivity of the chars produced.

43165 (DOE/ET/14928—1437) Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center). Jul 1981. Contract AC21-80ET14928. 60p. NTIS, PC A04/MF A01. Order Number DE83015281.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The unfired dynamic tests using the Process Evaluation Facility (PEF) have been completed during this quarter. The data from these tests will be used to verify the predictive analytical models being developed for the facility and to provide guidance on the maximum gas rates and transients that the system will safely tolerate. Initial evaluation of the component flow delay and dispersion data indicates good correlation with predicted values when realistic accounts are made for vessel dead volumes. Detailed operational and sampling procedures are being developed in preparation for the start of the fired, steady state tests to be conducted during the next quarter. Experimental data of the catalytic hydrolysis of COS to H_2S for improving sulfur removal from coal gas are being obtained in a bench-scale facility. Initial results have indicated high conversion rates with a conventional alumina-base catalyst and, with a properly conditioned catalyst, no poisoning has been noted with 0.1% ethane added to the gas mixture. The analytical system model work has continued. The hydrogen sulfide absorber model has been developed, and models for the combined-cycle transient simulation were modified and adapted to the overall system simulation software package. New equipment installation and modifications to the PEF have been completed which will improve the quality of the technical data to be gathered during fired system operation in the next quarter. A Request for Quotation has been developed for the design and procurement of an alternate gasifier system for inclusion in the PEF. 29 figures, 5 tables.

43166 (DOE/ET/14928—1438) Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process. Quarterly report, 29 June 1981-27 September 1981. (General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center). Oct 1981. Contract AC21-80ET14928. 113p. NTIS, PC A06/MF A01. Order Number DE83015282.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Process Evaluation Facility (PEF) facility was operated in accordance with the detailed test plan generated for the remainder of the 1981 operational test period. Operation of the system through the test runs was excellent, and facility problems encountered were of a correctable nature. Some difficulty was experienced during the checkout phase, associated with gasifier bed agglomeration and fines carryover. During this checkout period, operation was on a coal with an exceptionally high fines and ash content. Replacement of this coal with a batch of sized Illinois No. 6 eliminated these recurrent problems. The reduction of the data obtained during the facility operation in the quarter continues. The preliminary water balance calculations for both the gasifier and cleanup systems have been made and are demonstrating good balance closure. Data related to the chemical cleanup system has been reduced for tests in which the reboiler steam flow, lean solution flow rate, and semi-lean solution flow rates were varied. Data from the dynamic volume test has been reduced, and has shown that the measured dynamic volume is similar to the physical volume, indicating very little entrapped gas volume in the gasifier refractory, or elsewhere. System leakages were found to be very low. The final model for the fuel system dynamic simulation model has been developed. An evaluation of the NH_3 stripping requirements from the condensate was continued. An analysis of the vapor/liquid equilibrium for condensate conditions was conducted. Based on the results of this analysis, an experimental apparatus to evaluate stripping requirements has been constructed. The flare system modifications for incineration of produced, gas-containing waste process liquors has been demonstrated successfully. A Request for Proposal for an advanced gasifier design activity was prepared and sent to eight companies.

43167 (DOE/FE/05147—T16) Coal-gasification basic research and cost studies. Quarterly report No. 3. (McKee (Davy) Corp., Cleveland, OH (USA)). 16 Jul 1982. Contract AC21-81FE05147. 113p. NTIS, PC A06/MF A01. Order Number DE83011697.

Portions are illegible in microfiche products.

Two major activities or tasks are being performed. The first activity (Task I) is the development of a process or processes to produce agglomerates from coal fines suitable for use as a feed to fixed-bed gasifiers. Seven US coals are being investigated. The second activity (Task II) is a design and cost study to examine the effects of gasifier selection on overall plant costs for a commercial-scale coal gasification facility. Task I work during the Third Quarter involved laboratory experimentation and some limited cost studies. Twenty-four different materials and many material combinations were evaluated as potential binders for coal briquettes. Potential binder materials were initially prescreened in wafer briquette tests. Of the materials tested,approximately a dozen showed good promise as a suitable binder. The most promising candidates were then used to produce larger briquetts on a double-roll press. Binderless briquetting was also investigated. In addition, work was initiated during the period in developing suitable pelletizing processes for coal fines and a tour was made of commercial briquetting plants in Europe. The results to date indicate that there is a good probability that a suitable process that will result in agglomerates that will stand up in a fixed-bed gasifier will be techincally possible for each of the seven coals being studied. The econonics of these processes, however, are uncertain at this time and are being studied. Task II work during the Third Quarter centered on (1) completing the capital and operating cost estimates for a large coal gasification plant based on Winkler gasifiers and (2) initiating the design of a similar plant based on Molten Salt gasifiers. Capital and operating costs for the Molten Salt gasification plant and for a fixed-bed gasification plant incorporating agglomeration facilities will be developed during the next Quarter.

43168 (DOE/FE/05147—T17) Coal-gasification basic research and cost studies. Quarterly report 2. (McKee (Davy) Corp., Cleveland, OH (USA)). 16 Apr 1982. Contract AC21-81FE05147. 61p. NTIS, PC A04/MF A01. Order Number DE83011720.

Portions are illegible in microfiche products.

Coal-gasification basic research and cost studies performed at Davy McKee Corporation supporting the Department of Energy's coal gasification program is on schedule through the Second Quarter. It is anticipated that work will continue on schedule for the remainder of the program. During the Second Quarter, efforts were concentrated on evaluations, laboratory studies and design activities. In Task I, information on how coals perform in and around fixed-bed gasifiers was reviewed and standards and tests to evaluate the expected performance of agglomerates were developed. The economics of coal agglomeration, the preferred size of agglomerates, and possible coal upgrading methods to enhance agglomerates were examined. Two topical reports describing the findings were prepared and were issued. Approximately 200 separate wafer briquetting runs and 29 double-roll briquetting runs were performed during the period to evaluate potential binders and to investigate different briquetting variables. In Task II, the design of a Winkler coal gasification plant to replace a two-stage gasifier plant in the original Erie Mining facility design was completed, and work on the design of a Combustion Engineering entrained-flow gasification plant replacement was initiated. 24 figures, 12 tables.

43169 (DOE/MC/14273—1411) Equipment-performance survey of the Bi-Gas coal-gasification pilot plant. (Mechanical Technology, Inc., Latham, NY (USA)). 29 Apr 1983. Contract AC21-80MC14273. 123p. NTIS, PC A06/MF A01. Order Number DE83011405.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An equipment performance survey was conducted at the Bi-Gas Coal Gasification Pilot Plant, Homer City, Indiana, under contract with the US Department of Energy, Morgantown Energy Technology Center (METC). Review of plant design files and maintenance records identified incidences of malfunctions and history of corrective modifications of equipment in the pilot plant. Inter-

views with plant engineering, operation, and maintenance personnel were made to obtain details of the malfunctions, probable causes, corrective actions, and the results of the corrective actions on ten selected equipment items. Based on the survey, significant experience and technology gaps in the equipment for the Bi-Gas pilot plant were identified.

43170 **(DOE/MC/14593—1416) Mechanism of catalytic gasification of coal char. Final report, tasks 1-5.** Wood, B.J.; Brittain, R.D.; Chan, B.L.; Fleming, R.H.; Lau, K.H.; McMillen, D.F.; Sancier, K.M.; Sheridan, D.R.; Wise, H. (SRI International, Menlo Park, CA (USA)). Jan 1983. Contract AC21-80MC14593. 111p. NTIS, PC A06/MF A01. Order Number DE83013078.

The objectives of this study were to determine the mechanisms involved in the gasification reactions of coal char catalyzed by various inorganic salts, and to identify the specific reaction steps and the parameters that control the catalytic process. We have used a variety of experimental tools to examine the behavior of several catalyst salts in contact with samples of chars from coals of various ranks and a mineral-free carbon black. From the results of these experimental studies, we have postulated a detailed mechanism for the action of the inorganic catalyst in char gasification. In this mechanism, a catalyst such as potassium carbonate in contact with char undergoes a chemical and physical transformation to form a molten oxide film that covers the char surface. This film serves as the oxygen transfer medium between the gaseous reactant (H_2O or CO_2) and the char. At the catalyst/char interface, the anions in the catalyst react to form a phenolate-type intermediate that later splits out CO. The anions are replenished by reaction between the oxidizing gas and the oxide at the gas/catalyst interface. Net transport of oxygen from gas to char occurs by diffusion of the species in the molten catalyst film. This insight into the mechanism of catalyst action in char gasification led us to investigate the possible use of sodium chloride (NaCl), a demonstrably poor catalyst, as a gasification catalyst. Results of preliminary experiments confirm that a simple steam-oxygen pretreatment significantly enhances the reactivity of the NaCl-promoted char with steam. 30 figures, 15 tables.

43171 **(DOE/MC/14705—1429) Coal gasification support studies. Vol. II, Task 2. Studies of fluidized-bed reactors in coal gasification processes. Final report, November 19, 1981-August 15, 1982.** (Institute of Gas Technology, Chicago, IL (USA)). Jun 1983. Contract AC21-80MC14705. 302p. NTIS, PC A14/MF A01. Order Number DE83014381.

The effects of system pressure on solids entrainment and on transport disengaging height (TDH) in gas-solid fluidized beds were experimentally investigated. The specific entrainment rate constant was found to be linearly proportional to the gas density up to a system pressure of 300 psig (a gas density of 1.52 lb/ft^3). The specific entrainment rate constants from this study were found to lie within the limits of predictions from the existing correlations. TDH was found to increase linearly with both system pressure and gas velocity. The dynamic behavior of gas and solids in an overflow standpipe as a function of several operational variables was also studied. Flow transitions (that is, solids defluidization and gas-flow reversal) were found to be a function of the solids flow rate as well as solids material properties, standpipe aeration, and standpipe geometry. Trends depicting solids defluidization and gas-flow-reversal data are discussed in this report. The effect of distributor design on the tendency of coal char to sinter in fluidized beds was determined. Three distributor configurations were tested at various temperatures, gas velocities, and oxygen concentrations. It was found that there is no difference in using either single- or multiple-nozzle distributors to prevent sintering. A single-nozzle distributor with a concentric annular opening, however, was found to be effective in preventing sintering. The void-gas stripping characteristics of porous solids in standpipes operating in moving packed-bed and fluidized-bed modes were investigated. In this report, the effects of the stripper diameter and stripper-gas injection location on stripping-gas requirements are discussed, and a method of predicting stripping-gas requirements for a porous particle system is presented. 165 figures, 32 tables.

43172 **(DOE/MC/14705—1430) Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982.** (Institute of Gas Technology, Chicago, IL (USA)). Jun 1983. Contract AC21-80MC14705. 256p. NTIS, PC A12/MF A01. Order Number DE83014634.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report summarizes research conducted on several prospective gas- and effluent-handling systems for future coal-gasification plants. Included in the report are results on the resistance of a cobalt-molybdenum water-gas shift catalyst to hydrogen cyanide (HCN) and hydrogen chloride (HCl), which are found in raw fuel gases. HCN was found to have no measurable effect on the catalyst; HCl was found to cause irreversible poisoning. Also presented are data on the vapor-liquid equilibrium behavior of synthesis gas-benzene mixtures and of synthesis gas-water mixtures, including a few ammonia-carbon dioxide-water mixtures that are useful for quench system design. Studies that used a novel, air-regenerable sorbent to remove sulfur compounds from coal-drived fuel gases at elevated temperatures are discussed. In addition, this report discusses exploratory studies that were made on the catalytic properties of silica-supported Group IIA metal oxides toward the hydrolysis of carbonyl sulfide (COS) and HCN. The results suggest that magnesium- and strontium-based catalysts might be competitive with commercial COS hydrolysis catalysts. The ammonia decomposition activities of several materials at temperatures between 1000° and 1200°F in the presence of hydrogen sulfide (H_2S) were examined. Although previous studies conducted at 1400°F indicated good catalytic activity, these studies at the lower temperatures indicated that H_2S has an inhibitory effect on ammonia decomposition. Finally, experimental studies were made on the separation characteristics of several commercial microfiltration, ultrafiltration, and reverse osmosis membrane systems as applied to raw process condensates. The results suggest that membrane separation is a viable option when used in combination with other conventional treatment techniques and that it may offer significant economic benefits. 68 figures, 59 tables.

43173 **(DOE/MC/19403—2) Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983.** Anderson, G.L.; Berry, F.O.; St. John, M. (Institute of Gas Technology, Chicago, IL (USA)). Jun 1983. Contract AC21-82MC19403. 40p. NTIS, PC A03/MF A01. Order Number DE83012608.

Five metal oxide sorbents were selected for laboratory-scale testing of their sulfur removal characteristics, sulfur removal capacities, and elemental sulfur production capabilities for use in the high-temperature sulfur removal process. These were (1) manganous oxide, MnO; (2) cobalt aluminate, $CoAl_2O_4$; (3) iron chromite, $FeCr_2O_4$; (4) iron orthosilicate, Fe_2SiO_4; and (5) cobalt titanate, Co_2TiO_4. Laboratory-scale fixed-bed reactor studies in a 1-inch OD Schedule 40 refractory-lined 316SS reactor were completed this quarter with the cobalt aluminate and manganous oxide sorbents. Both sorbents exhibited useful sulfur removal capacities. However, neither sorbent produced elemental sulfur during regeneration in the proportions expected. Two molten alkali carbonate mixtures were selected for laboratory-scale testing of their HCl removal capabilities at 1200°F. The molten alkali mixtures chosen were a 52% lithium carbonate/48% sodium carbonate mixture and a 43% lithium carbonate/57% potassium carbonate mixture with melting points of 925° and 910°F, respectively. The porous ceramic selected for supporting the molten carbonate mixtures was magnesia, MgO. Several cylindrical pellets of the MgO-supported 52% lithium/48% sodium carbonate mixture were prepared and characterized this quarter. Several alkali-carbonate-containing ceramic pellets from the IGT thermal energy storage program were also secured for testing purposes. This included Na_2CO_3/MgO and Na_2CO_3/$NaAlO_2$ pellets and an $NaAlO_2$-supported 52% lithium/48% sodium molten carbonate mixture. These pellets will be useful for comparison testing. Progress was also made this quarter in assembling the supporting equipment.

43174 (DOE/NASA/0175—1-Vol.1) Fuel quality/processing study. Volume I. Overview and results. Jones, G.E. Jr. (Gulf Research and Development Co., Pittsburgh, PA (USA)). May 1982. Contract AI01-77ET13111. 64p. (NASA-CR—165326-Vol.1). NTIS, PC A04/MF A01. Order Number DE83015272.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Industrial gas turbines can be used more effectively for electrical power generation if an appropriate balance can be found between turbine improvements, fuel choices, fuel upgrading, on-site fuel processing, and exhaust gas treatment. This study provides information that can facilitate finding that balance. Furthermore, because the study examined paths starting with raw liquid fuel sources and leading to the generation of electrical power and acceptable exhaust gases, the study reveals interactions between the turbine operation cycle and the cost effectiveness of fuel upgrading vs on-site processing options. Variations in turbine design were, as directed, excluded from this study. Upgrading schemes were limited to those expected to be commercially available in the next few years. Nevertheless the cost/quality relationships and tradeoffs developed in this study should help guide both future turbine design as well as the selection of raw materials, their upgrading schemes, and the on-site fuel or exhaust gas processing options. The various combinations among raw materials, processing schemes, on-site upgrading choices, turbine cycle types and turbine duty cycles provided about 600 feasible paths from fossil fuel sources to electrical power and acceptable exhaust gas. Because available fuel upgrading schemes simultaneously alter several attributes of the fuel being upgraded, the study developed comprehensive cost/quality tradeoffs by comparisons among the several hundred feasible paths. The final report for this study consists of four volumes: Volume I, SUMMARY REPORT, represents an overview of the entire study; Volume II, LITERATURE SURVEY; Volume III, FUEL UPGRADING STUDIES; and Volume IV results are related to further treatment of the fuel at the turbine and processing the exhaust gas.

43175 (DOE/NASA/0175—1-Vol.2) Fuel quality/processing study. Volume II. Literature survey. Jones, G.E. Jr.; Amero, R.; Murthy, B.; Cutrone, M. (Gulf Research and Development Co., Pittsburgh, PA (USA)). Oct 1981. Contract AI01-77ET13111. 139p. (NASA-CR—165326-Vol.2). NTIS, PC A07/MF A01. Order Number DE83015273.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The literature survey of petroleum-derived fuels for gas turbine applications addresses both distillate and residual petroleum-derived fuels. This same survey also defines properties and characteristics of current and near-future petroleum distillate fuel. Crude oil produces significant quantities of residual fuel whose properties frequently require substantial upgrading. The literature survey for coal liquid products and processes indicates differences between the relevant processes have less impact upon product properties than do the separation steps or other down-stream processing used thus far to produce product samples. The differences in coal liquid products disclosed by the literature survey will help define the cost/quality issues to be addressed in subsequent tasks of this project. The survey for shale oil properties indicates a need to consider qualities of products both from in-situ and from surface retorting. Metals content in shale oils will be a problem, perhaps even for distillate-type products. The literature survey for fuel additives deals with reducing the adverse effects of corrosion and ash deposition in a turbine. The literature survey for on-site treatment of fuels also deals with techniques for removing small amounts of harmful substances. The literature survey for SO/sub x/ control by exhaust gas treatment discloses very little information dealing directly with SO/sub x/ removal from industrial gas turbine off gas. It does identify processes which may be used to estimate costs associated with a possible future SO/sub x/ removal problem related to industrial gas turbines. The literature survey for exhaust gas NO/sub x/ control considers NO/sub x/ generated from fuel nitrogen as well as NO/sub x/ generated from the air-supplied N_2.

43176 (DOE/NASA/0175—1-Vol.3) Fuel quality/processing study. Vol. III. Fuel-upgrading studies. Jones, G.E. Jr.; Bruggink, P.; Sinnett, C. (Gulf Research and Development Co., Pittsburgh, PA (USA)). Oct 1981. Contract AI01-77ET13111. 147p. (NASA-CR—165326-Vol.3). NTIS MF A01. Order Number DE83015274.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

This volume describes the upgrading schemes from which upgrading cost and energy requirements were derived. Each scheme is self-sufficient and produces a marketable slate of products. A few schemes are base cases. These produce conventional fuel products for which selling price estimates were already available. The other schemes reflect a variety of ways for making certain lower-than-conventional-quality fuels. These fuels are deemed potentially usable in industrial gas turbines. As detailed in the body of this volume, comparisons between these other schemes and the base case schemes provide the costs for producing industrial gas turbine fuels from the several raw materials. This volume is organized into two parts. One part treats schemes based upon modification of generic existing refineries. The other treats schemes representing grass roots upgrading facilities. Raw materials for the modified existing refinery schemes include petroleum and shale oil. Coal liquids processing in modified existing refineries does not appear to make economic sense. The grass root schemes process not only petroleum components and shale oil but also coal liquids. This volume is the third of four volumes constituting the study's final report. The first summarizes the results. The second presents a literature survey. The last volume examines the economics of relevant on site options for treating the turbine fuel or processing the turbine exhaust gases.

43177 (DOE/NASA/0175—1-Vol.4) Fuel quality/processing study. Volume IV. On-site processing studie Jones, G.E. Jr.; Cutrone, M.; Doering, H.; Hickey, J. (Gulf Research and Development Co., Pittsburgh, PA (USA)). Oct 1981. Contract AI01-77ET13111. 103p. (NASA-CR—165326-Vol.4). NTIS, PC A06/MF A01. Order Number DE83015275.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Costs have been generated for fuel washing/treatment operations and exhaust gas DeNOx for selected cases. These costs are presented as incremental costs over a base case. The base case combined cycle operates on distillate fuel. Consequently, all costs associated with installation and operation of a fuel treatment system and the exhaust gas DeNOx system are, by definition, incremental over the base case. Similarly, costs for installation and operation of a fuel treatment system are incremental for the simple cycle case. The data in this report includes a complete cost estimate case for high nitrogen, ash-forming fuel in simple cycle and combined cycle applications. Fuel treatment costs are presented for petroleum residual fuel. Coal-derived liquids and shale oils are not expected to require on-site treatment since CDL's are expected to be commercially available as essentially ash-free distillates, whereas shale oils produced by above ground retort will be upgraded at the conversion facility to reduce gums and meet transportation requirements. The upgrading is expected to reduce trace element constituents, e.g., arsenic (whose corrosive effects are not known), nickel, vanadium, etc. to levels tolerable by today's gas turbines. NOx reduction by exhaust gas treatment (catalytic DeNOx) is treated generically as a function of nitrogen content and DeNOx effectiveness. Costs at effectiveness levels of 77.5%, 85% and 90% are presented. SO/sub x/ reduction by exhaust gas treatment by three processes (lime/limestone, Wellman-Lord, and Shell-UOP) has been evaluated. Economics are expressed in $/kWh cost for sulfur removal levels consistent with fuel sulfur levels from 0.8 to 2.5 weight percent sulfur in the fuel.

43178 (DOE/PETC/QTR—83/2) Quarterly technical progress report, January 1-March 31, 1983. (Department of Energy, Pittsburgh, PA (USA). Pittsburgh Energy Technology Center). Jun 1983. 99p. NTIS, PC A05/MF A01. Order Number DE83015050.

A surprisingly successful two-stage liquefaction run at the Wilsonville Advanced Coal Liquefaction Process Development Unit was completed in January. Distillate yields far exceeded our

anticipated results for a long-term test. This and one other Integrated Two-Stage Liquefaction (ITSL) run at Wilsonville demonstrated that this facility can, indeed, operate using only short contact time coal dissolution while still producing a high yield of distillate product per unit of hydrogen consumed. A long-term ITSL test at Lummus completed a major portion of the contract involving facility operation to test catalyst performance over an expended lifetime. Air Products and Chemicals, Inc., initiated their subcontractor selection for the installation of the Liquid Phase Methanol Process Development Unit at LaPorte, Texas. Catalyst studies for the selective conversion of synthesis gas, in a single or two-step operation, to high octane gasoline or other transportation fuels, were continued at Air Products and Chemicals, Inc.; Mobil; and Union Carbide. Fundamental studies in direct liquefaction at PETC have now shown that significant and preferential vehicle incorporation occurs during short contact time liquefaction. Boiler firing of coal-oil-water emulsions has been completed at Adelphi University. Combustion studies have been focusing on the analysis of properties of the Atlantic Research Corporation's ARC-Coal coal-water slurry fuel samples currently being tested in our 700-hp watertube boiler. In response to PETC's Program Research and Development Announcement for Advanced Combined NO/sub x//SO/sub x/ Removal Systems, fourteen proposals were submitted and five were selected for award.

43179 (EPRI-AP—3006, pp 3.1-3.33) **Overview of gasification technology.** Holt, N.A. (Electric Power Research Inst., Palo Alto, CA). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

By removing the sulfur-bearing and particulate matter from the gas prior to combustion, coal gasification offers attractive schemes for environmentally superior domestic resource based plants. Currently, the Lurgi dry ash, Koppers-Totzek, Winkler and Wellman-Galusha processes are operated commercially. However, at this time only the small Wellman producers are in use in the United States. Lurgi dry ash plant based on North Dakota lignite is in construction for Great Plains Associates. Proposals for plants based on the Koppers-Totzek and Winkler processes and other gasification technologies are currently before the Synthetic Fuels Corporation. Over the next 5 years, several other coal gasification processes should be demonstrated at commercial sizes. They include Texaco, British Gas Corporation/Lurgi, Shell, Westinghouse, Pressurized Winkler, and Allis-Chalmers Kilngas processes. The key development issues for the major gasification processes are outlined in this presentation together with a discussion of the environmental aspects relating to control of the liquid ad solid effluents. These developments are backed by major organizations so that capabilities necessary to support commercial deployment on a large-scale in the 1990s should be forthcoming. 3 figures, 7 tables.

43180 (EPRI-AP—3006, pp 17.1-17.13) **Coal gasification at Caterpillar's York, Pennsylvania, plant.** Norton, W.W.; Welsh, J.E. Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Low-Btu coal gasification was found to be technically feasible, reliable, and environmentally acceptable. The low-Btu coal gas produced is an acceptable replacement fuel (at 100% plant load) and is presently less expensive than electricity, propane, No. 2 fuel oil, or natural gas (incrementally priced as a boiler fuel) on a cost-per-million Btu basis. York projects that the coal gas cost will become comparable to the cost of natural gas for heat treat furnace applications by the third quarter of 1982. York recommends the operation and development of low-Btu coal gasification because of the current economic benefits at the York plant and for the long-term benefits it offers the corporation. The economic benefits to be gained at York result from: (1) a decreasing average cost of coal gas as the load factor rises; and (2) the greater rates of increase for alternative energy sources (i.e., electricity, oil, and natural gas). York's projects will take advantage of these factors to maximize the economic benefit to be derived from the plant's operation. The potential long-term corporate benefits include: (1) development of an energy-core concept for utilizing coal gas for Greenfield sites (i.e., fuel for heat-treating purposes or generating steam and power); (2) development of low-Btu engines for future sales; (3) establishment of an environmentally acceptable method of utilizing coal, and thus encouragement for the expansion of coal use while decreasing the use of oil, natural gas, and propane. 2 figures.

43181 (EPRI-AP—3006, pp 19.1-19.46) **Memphis industrial fuel gas demonstration plant.** Gray, R.W. (Memphis Light, Gas & Water Division, TN). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The Memphis Light, Gas and Water Division's Coal Gasification Plant is a joint effort on the part of the utility, the US Government, and private industry to produce medium-Btu and pipeline quality gas from coal. The U-gas Process has been selected for the demonstration plant program. Advantages and unique aspects of the U-GAS Process include the capability to: (1) gasify all ranks of coal regardless of sulfur content and tendencies toward agglomeration; (2) recycle and gasify fines that are normally lost in the product gas of fluidized-bed reactors; (3) design for simple, safe, and reliable operation; and (4) produce a product gas that is free of tar and oils. The overall program is being conducted in three phases over an 8-year period. Phase I, completed in December 1979, consisted of Program Development and Conceptual Design; Phase II, estimated to last 72 months, involves detailed design (24 months) and construction (48 months); Phase III is the operation of the demonstration plant. Detailed coverage is presented on the tasks completed in Phase I. In addition, the Conoco Methanation Process is discussed. 14 figures, 7 tables.

43182 **(NE-SBT—82-30) Vyrmethane. Progress report stage 5. In situ production of methane gas from peat.** Martinell, R. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). [nd]. 108p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750765.

Portions are illegible in microfiche products.

The Vyrmethane process means that bog water containing methane gas is circulated in a closed system and degassed. By this procedure the microbiological activity in the bog stimulates and new methane is produced and dissolved in the water, which circulates to a degassing station. From the degassing station the methane gas can be used for different purposes and the degassed water is infiltrated back in the peat bog. The degradation process is described by McCarty (Stanford 1964). According to this description all COD (Chemical Oxygen Demand) is supposed to be converted to methane. The Vyrmethane method does not reach this ideal result. Consequently the produced gas also includes carbon dioxide. The running cost for the process is mainly depending on the water circulation e.g. the demand of energy for the pumps. Consequently the result is propotional to the methane, which can be degassed from the circulated water. The results reached, so far, indicate that one added unit of mechanical energy is giving five units of heat energy in the form of methane gas. Better results are in prospect. This report, which is a following up of the pilot plants started up after 1978, is discussing the technical and economical conditions for the process. Consequently it is suggested that a number of full-scale prototype plants are built, studied further and that preparations are made for a demonstration stage including about 200 plants with geographical spreading out.

43183 **(NP—3770043) Experiments and model calculations on pyrolysis and gasification of Rhenish lignite in an inclined revolving pipe.** Masek, P. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 20 Feb 1981. 163p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770043.

Portions are illegible in microfiche products ; Thesis.

In this study experiments and model calculations on pyrolysis and gasification of lignite of Ruhr provenance were carried out in the coals own water in a revolving pipe heated in counterflow from outside. Coal transport is kept up by the inclination and revolution of the pipe. During transport the raw coal is first of all dried and degasified. At the higher temperatures the coal which is still degasified is gasified in the water vapour from the coals own humidity and the gaseous products of the pyrolysis. In order to clarify

the complex interconnections pyrolysis, gasification and coal transport are studied in detail under a total pressure of 1 bar. Based on the acquired data and knowledge a one-dimensional mathematical model of revolving pipe gasification was formulated and programmed. By mathematical simulation of several operational states and by analyzing the effects of variations of the essential operational parameters and several hypotheses on partial procedures it was possible to gain important knowledge on the whole process.

43184 **(NP—3770150) Coal preheating plant according to the PRECARBONsup(R) process successfully commissioned for DONNER-HANNA Coke Joint Venture in Buffalo, NY, USA.** Oct 1980. 4p. (In German, English). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770150.

In the DONNER-HANNA coke facility in Buffalo coal is thermally treated according to the new PRECARBON process. The process was retrofitted to the existing No. 4 battery. The main design data of the coke oven battery and the PRECARBON plant as well as some special features of the plant are listed.

43185 **(ORNL/FMP—83/2) AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983.** (Oak Ridge National Lab., TN (USA)). May 1983. Contract W-7405-ENG-26. 423p. NTIS, PC A18/MF A01. Order Number DE83014888.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objective of the AR & TD Fossil-Energy Materials Program is to conduct research and developmet on materials for fossil-energy applications with a focus on the longer-term and generic needs of the various fossil-fuel technologies. The program includes research aimed toward a better understanding of materials behavior in fossil-energy environments and the development of new materials capable of substantial enhancement of plant operations and reliability. The management of the Program has been decentralized to DOE Oak Ridge Operations Office (ORO) and the Oak Ridge National Laboratory (ORNL) as technical support contractor. The ORNL Fossil Energy Materials Program Office compiles and issues this combined quarterly progress report from camera-ready copies submitted by each of the participating subcontractor organizations. Distribution is as shown on pages 439-446. Future reports will be issued on a quarterly basis to a similar distribution. We hope thie series of AR & TD Fossil Energy Materials Program quarterly progress reports will aid in the dissemination of information developed on the program.

43186 **(UCRL—89010) Centralia partial-seam CRIP test.** Hill, R.W.; Thorsness, C.B.; Thompson, D.S. (Lawrence Livermore National Lab., CA (USA)). 20 Jun 1983. Contract W-7405-ENG-48. 14p. (CONF-830827—1). NTIS, PC A02/MF A01. Order Number DE83015454.

From 9. annual symposium on underground coal gasification; Bloomingdale, IL, USA (7 Aug 1983).

The controlled retracting injection point (CRIP) concept for underground coal gasification was successfully tested on a small scale in early 1982 in the large block tests, near Centralia, Washington. The basic idea of the CRIP concept is to start a new burn in fresh coal, upstream of the old burn, whenever the quality of the product gas from the old burn falls to an uneconomic level. To start the new burn, a section of the injection pipe is burned off so as to establish a new injection point. The Centralia partial-seam CRIP test, described here, will be a larger scale test of the concept - the first of several tests in a commercialization program designed to develop the CRIP concept of underground coal gasification as applied to a high-wall geometry. The test will be carried out jointly by Lawrence Livermore National Laboratory (LLNL) and Washington Irrigation and Development Company (WIDCO), whose open-pit coal mine is the site of the test. Sponsors of the test are the Department of Energy, the Gas Research Institute, and two northwestern utilities: the Washington Water Power Company and Pacific Power and Light. The Centralia partial-seam test is designed to use half the coal seam thickness and to allow for four or five injection point withdrawals. The main test objectives are (1) to determine the appropriate spacing and timing for injection point withdrawal, and (2) to study the gas composition and burn width. Steam-oxygen injection is planned, the expected coal consumption is 2000 tons during 30 days of gasification, and the dry-product-gas heating value is estimated to be 270 Btu/scf. 8 figures, 2 tables.

43187 **Bacterial coal desulfurization.** Andrews, G.F.; Maczuga, J. (State Univ. of New York, Buffalo). *Biotechnology and Bioengineering Symposium;* No. 12, 337-348(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

A bacterial process based on thiobacilli looks promising as a way of removing pyritic sulfur from pulverized coal. Experiments have shown that 90% pyritic sulfur removal is possible in two weeks with a mixed culture of bacteria, coal smaller than 100 mesh, and pH controlled at 2.5. A fortunate and previously unnoticed fact is that the cells solubilize the sulfur preferentially over the iron. This must be related to the higher energy yield available from sulfur oxidation and is thought to be due to sulfur atoms diffusing along dislocations in the pyrite crystals to the cells at the surface. 6 figures, 1 table.

0105 By-products

43188 **(BMFT-FB-T—83-055) Methane drainage from coal seams by surface drillings.** Demuth, H.; Mueller, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 133p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83751036.

Portions are illegible in microfiche products.

The study deals with the technical and economic feasibility of methane production from coal deposits by means of deep drillings from the ground surface. Therefore we have elaborated the technical and economic valuation terms, in particular the main factors like gas reserves and productive capacity of the gas. The reserve calculation of the Saar coal basin has demonstrated that the reserve situation is comparable with the richest gas fields in the world. The crucial points are the reservoir characteristics of coal deposits (low permeability, predominant adsorptive gas storage) which must be improved by suitable borehole treatments. The result of the study is that it seems possible to produce methane gas but the economics has to be proved by further field tests in the future.

43189 **(BMFT-FB-T—83-067) Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing.** Glaser, H.; Marrett, R.; Tillmanns, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 111p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83751038.

Portions are illegible in microfiche products.

Conditions for the economic processing of super needle coke from coal tar pitch are: - continuous temperature rising and low final coking temperature; coking process under ambient pressure; low turbulence in the reaction zone; continuous operation conditions. Graphitized pilot electrodes manufactured of super needle coke made of coal tar pitch have better specific electrical resistance values, better CTE-values and lower mechanical strength data in comparison to those made of petrol needle coke. These results make it necessary to adjust the technology of graphite electrode manufacturing.

0106 Properties

REFER ALSO TO CITATION(S) 43256

43190 **(BMFT-FB-T—83-068) Systematic studies on coals of different deposits, including their mineral matter.** Kuehn, L.; Plogmann, H.; Schliephake, R.W.; Wolff-Fischer, E. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 84p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751039.

Portions are illegible in microfiche products.

Coal petrology and mineralogy of numerous coal samples from various deposits of different geological age were investigated. Besides known parameters such as degree of reflexion and maceral group composition other relevant petrografic properties were determined beyond routine: 1. Content of macerals and maceral-types of the vitrinite- and inertinite-group (coking and hydrogenation). 2. Degree of bituminization of vitrinites (coking and hydrogenation). 3. Intergrowth of macerals in coal-grains (coking and gasification). Relating to mineral matter of coal, the methods of its determination were improved. In particular efforts were made for a quantitative mineral analysis. For the characterization of mineral matter of coal special attention was paid to clay minerals. We succeeded in characterizing chemically an illite from the productive carboniferous of the Ruhr region for the first time. The behaviour of mineral matter during hydrogenation and allothermal gasification with water vapor was investigated on residues of pilot plants.

43191 **(DOE/MC/16221—T2) Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981.** Seery, D.J.; Freihaut, J.D. (United Technologies Research Center, East Hartford, CT (USA)). Jul 1981. Contract AC21-81MC16221. 44p. (R—81-955568-1). NTIS, PC A03/MF A01. Order Number DE81028604.

Portions are illegible in microfiche products.

This report presents work performed in the first quarter of Contract DE-AC21-81MC16221 for an investigation of coal devolatilization. The objectives of this study are to determine the relationship of structural characteristics of a coal to its thermal devolatilization behavior and to ascertain the effects of heating rate, final temperature, ambient pressure and particle size on thermal devolatilization behavior. The report discusses sample selection, techniques of structural characterization of samples and the design of one of the experimental systems used to investigate the thermal devolatilization characteristics of coal. Some initial results from the characterization techniques and the thermal devolatilization reactor are shown. 14 figures, 9 tables.

43192 **(NP—3770182) Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District.** Hemmen, M. (Technische Hochschule Aachen (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 27 May 1982. 182p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770182.

Portions are illegible in microfiche products; Thesis.

A thesis contains a chapter on methods of characterization of ash and mineral substance, in doing so plasma decarbonization density separation and density analysis, chemical analysis, thermogravimetric investigations and phase analysis are of special interest. The chapter on the investigations of the pyrites contains sample listing and description, preparation and characterization of the pyrites and their melting behaviour. In the same way the chapter on investigations of the carbonates is subdivided.

43193 **(PNL-SA—10508) Fly ash and coal mineral matter transformations during heating.** Baer, D.R.; Smith, R.D. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 47p. NTIS, PC A03/MF A01. Order Number DE83015078.

A study is reported of surface segregation phenomena for fly ash and aluminosilicates representative of coal mineral matter during heating. The materials studied included a 20-μm average-diameter fly-ash powder, a glass prepared from the fly ash, and Ca- and K-rich aluminosilicate minerals. The samples were heated both in air and under vacuum for extended periods at temperatures up to 1100°C. XPS, Auger and SIMS methods were used to obtain relative surface elemental concentrations for major and minor components and depth profiles for some of the samples. Major differences were noted between samples heated in air (oxidizing) and those heated in vacuum (reducing) environments. For the fly-ash glass heated in air Fe, Ti and Mg become enriched on the surfaces while heating in vacuum leads to Si surface segregation. Different trends upon heating were also observed for the Ca- and K-rich aluminosilicates. The results indicate two levels of surface enrichment upon the fly-ash glass; a thin (<500 A) layer and a thicker (1- to 2-μm) layer most evident for heating in air where an Fe-rich layer is formed. The present results indicate that the rates of surface segregation may not be sufficiently fast on the time scale of fly-ash formation to result in equilibrium surface segregation and that condensation processes during fly-ash formation probably play a major role in the observed fly-ash surface enrichments.

0108 Waste Management

REFER ALSO TO CITATION(S) 43181, 43222, 43225, 43226, 43228, 43234, 43235, 43240, 43254, 43446, 44739, 44781

43194 (CONF-8208123—, pp 269-286) **Coal-fired power generation in Ontario - A 60 year phenomenon coal ash disposal in Ontario. A 1000 year legacy.** Dodd, D.J.R. (Ontario Hydro Research Division, Toronto, Ontario, Canada). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

The production of electricity from coal combustion started in Ontario in 1951; by 2010 most of Ontario Hydro's existing coal-fired power plants could be largely retired. The legacy of this 60 year period of coal combustion will be a few fly ash-cement buildings, a few fly ash-filled bridge abutments and several large megatonne fly ash disposal sites. In-house research studies into ash leaching characteristics began 20 years after fly ash disposal commenced - current environmental awareness, coupled with advances in chemical analytical technology dictate that laboratory studies and disposal site monitoring will continue for years to come. Some of the variables - coal source, ash characteristics, disposal site location and design, leachate monitoring, collection and treatment plans - are discussed in relation to the Ontario situation and the anticipated time frame for continued study. Future areas for research and future prospects for large scale fly ash disposal projects are identified. The current findings indicate that properly engineered ash disposal projects are an asset, not a burden, to the people of Ontario.

43195 (CONF-8208123—, pp 254-268) **Disposal of waste material. Evaluation in the KHM project of short and long-term effects.** Hartlen, J.; Lundgren, T. (Coal-Health-Environment Project, Swedish State Power Board, Sweden). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

One of the main objectives of the Swedish Coal-Health-Environment Project is to assess the short and long term effects of the disposal of coal wastes on the environment. The situation described below has been the basis for the discussions, laboratory leaching tests and field studies carried out in the KHM Project. The results of the laboratory works are reported to the conference in a paper by Liem et al, while this paper discusses the water balance and construction measures. Certain trace elements in coal wastes are found in greater concentrations than in normal soils and rocks. As a result of the mineral alteration in the combustion process the mobility of some of the constituents may be higher in the waste than in the coal (or in sediments in general). On the other hand the alkaline properties of the waste reduce the mobility of many elements. Due to the continuous leaching out of buffering substances the pH of the leachate water will vary with time. The construction of trace elements in the leachate from a waste dump, exposed to acid rain, is governed by several factors. Beside the trace element composition and the leaching characteristic of the waste, the buffering capacity, the time and the water balance of the dump are judged to be the main controlling factors.

43196 (CONF-8208123—, pp 287-299) **Ocean disposal and construction with stabilized coal waste blocks.** Parker, J.H.; Woodhead, P.M.J.; Duedall, I.W. (Marine Sciences Reseach Center, State University of New York, U.S.A.); Carleton, H.R. (Materials Sciences and Engineering, State University of New York, U.S.A.). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

A multidisciplinary team of scientists at SUNY, Stony Brook is assessing the feasibility of using blocks of waste material from coal fired power plants for underwater construction, including building artificial fishing reefs. Experiments over the past five years, both in the laboratory and in the sea, suggest that coal waste blocks are environmentally acceptable in the ocean. On September 12, 1980, a 500-ton reef was constructed in the Atlantic, consisting of 15,00 solid blocks of stabilized FGD sludge and fly ash from coal burning power plants. The blocks were fabricated in collaboration with Conversion Systems, Inc. (Horsham, Pennsylvania) at a commercial concrete block plant. In preparation for block fabrication, a combination of different coal waste mixes, stabilization additives, and curing procedures were screened to develop candidate mix designs. Experiments were conducted at research facilities of the Besser Company in Alpena, Michigan to develop methods of successfully forming coal waste blocks with block making machines. The demonstration disposal reef is being monitored to assess environmental impacts which may occur and their relation to structural integrity and chemical properties of the coal waste blocks. Blocks are tested ultrasonically in the sea and also returned to the laboratory for compressive strength measurements. After almost two years in the sea, gradual increases in strength have been documented. The progress of biological colonization is also monitored and compared with existing reefs in the area. The fish benthos, and encrusting organisms are sampled and analyzed for uptake of block components. Data from fish tagging surveys have indicated significant increases in the resident populations of various species of fish and lobster.

43197 (CONF-8208123—, pp 300-310) **Ocean disposal of consolidated spray dryer flue gas desulfurization wastes.** Donnelly, J.R. (A/S Niro Atomizer, Copenhagen, Denmark); Webster, W.C. (Webster and Associates, Norristown, Penn.); Duedall, I.W.; Hsu, K.J.; Parker, J.H.; Woodhead, P.M.J. (Marine Sciences Research Center, State University of New York, New York). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Combustion of coal in electric power generating stations results in the production of large quantities of fly ash and flue gas desulfurization end products. These wastes must be disposed of by environmentally accepted means. Ocean disposal of these wastes is an attractive option for power stations located on coastal waterways. Dumping of fly ash and untreated wet FGD sludge is environmentally deleterious. However, wet scrubber sludge stabilized with fly ash can be formed into solid dense blocks which have been shown to be acceptable for ocean disposal. The Marine Science Research Center has been investigating this disposal option for the past five years. A new FGD technology, Spray Drying Absorption, was introduced about five years ago. This process produces a dry end product composed of fly ash, desulfurization reaction products and excess reagents. When lime is the reagent the end products can be dampened and consolidated into self-hardening dense blocks. Niro Atomizer has been investigating dry FGD end product disposal and utilization for the past three years. An assessment of the feasibility of using solid blocks formed from dry FGD end products for ocean reef construction is being performed by the Marine Sciences Research Center. Consolidated dry FGD end products from Niro Atomizer's Riverside dry FGD demonstration facility and Copenhagen dry FGD pilot plants were tested. These wastes represent low sulfur western and European coal applications. The end products were dampened and consolidated into Proctor cylinders. After curing, the cylinders were exposed in sea water systems including the open seas for up to 6 months. Block structural integrity was maintained during this period and pososity remained essentually unchanged. The unconfined compressive strength remained high during the test period.

43198 (CONF-8208123—, pp 311) **Marine disposal of fly ash from coal fired power plants.** Hjelmar, O. (Water Quality Institute, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

43199 (CONF-8208123—, pp 312-326) **Seawater scrubber effluent - an evaluation of possible ecological consequences.** Bjerkeng, B.; Knutzen, J. (Norwegian Institute for Water Research, Blindern, Oslo). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Two alternative arrangements for scrubber effluent discharge are considered: to the surface layer together with the cooling water, or from a separate outlet at about 50 m depth. Effects are considered both for untreated effluent and with lime treatment and areation of the effluent. The extension of water volumes with effluent concentrations above given limits are estimated for proposed power plant sites in the outer Oslofjord, and effects with respect to pH, oxygen, metals and polycyclic aromatic hydrocarbons are considered. The study indicates that mixed discharge of scrubber effluent and cooling water to the surface layer without treatment may harm the marine communities by causing mean pH reduction close to 0.5 units in the upper 10 m of the outer part of the Oslofjord. Treatment of the effluent will reduce the seriously affected area and volume of surface water masses with at least 90%. No significant harmful oxygen effects are indicated for a surface discharge. By deep water discharge of untreated scrubber effluent pH would be lowered only in intermediate layers, and in a relatively minor part of the total pelagic environment, making this discharge arrangement more acceptable as regards effects from acidification. The oxygen deficit will not be serious in the primary recipient area, but there may be unacceptable reduction of oxygen renewal in the deeper layers of the inner Oslofjord. Treatment will make pH-effects from a deep discharge negligible, and reduce oxygen demand with 80%, making the effluent acceptable in these respects for many recipients. Risk of metal effects seems moderate or small, while the data on discharge of polycyclic aromatic hydrocarbons (PAH) were too uncertain for conclusions at the time of the study.

43200 (CONF-8208123—, pp 330-337) **Treatment of alkaline wastewater from lignite-fired power plants.** Dziubek, A.M.; Kowal, A.L. (Institute of Environment Protection Engineering, Technical University of Wroclaw, Poland). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Given are characteristics of, and treatment methods for, alkaline wastewater from the hydrotransport of the fly ash from a lignite-fired power plant. The principal component of the fly ash is CaO. The impact of this type of wastes on the aquatic environment is considered. Two treatment procedures are tested: CO_2 recarbonation and aeration. The aeration of alkaline wastewaters yields good treatment efficiencies, bringing about the precipitation of calcium carbonate. Determined is the relationship between the duration of the treatment process and the chemical composition of the wastewater, as well as the aeration time required to achieve the desired decrease of the alkalinity and pH levels.

43201 (CONF-8208123—, pp 338-366) **Studies on the leaching and weathering processes of coal ashes.** Liem, H.; Sandstroem, M.; Wallin, T.; Carne, A. (Department of Inorganic Chemistry, Royal Institute of Technology, Stockholm, Sweden); Rydevik, U.; Thurenius, B. (Department of Analytical Chemistry, Royal Institute of Technology, Stockholm, Sweden); Moberg, P.O. (Scandiaconsult, Stockholm, Sweden). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Within the Swedish project Coal-Health-Environment (Kol-Haelsa-Miljoe) leaching studies were made on several types of coal ashes, fly ashes, bottom ashes and scrubber sludges. Studies were made on the effects of pH, pCl, pCO_3, pEDTA and pSO_4 in the leach solution on the leaching of metals from coal ashes. As a model for the leaching system, we studied the leaching of Cr, Co, Ni, Cu, Zn, Mo, Se, As, Cd, and Pb. The leaching of the metals

was found to increase with pH for pH less than 2 and pH greater than 9, and to decrease for $2 < pH < 6$. The metal leaching behaviour may in part be explained by the mass-action law. We have also made long-term leaching tests of several coal ashes from Danish and Finnish Power Plants using leaching water of different pH. The dominating crystalline phases in the different coal ashes have been identified by x-ray diffraction technique. The major species in the different coal ashes were found to be mullite, α-quartz (SiO_2) and the iron oxides magnetite and hematite. Leaching and x-ray studies were also made on the magnetic fraction of the fly ashes. Equilibrium analysis were made on the system Me-OH-Cl-CO_3^{2-}-SO_4^{2-}, where Me = Cr, Co, Ni, Cu, Zn, Mo, Se, As, Cd and Pb, partly using the computer program HALTAFALL. A model for the metal leaching from a coal ash deposit will be discussed.

43202 (CONF-8208123—, pp 367-376) **Comparison of different methods for estimating the leaching of heavy metals from coal combustion waste.** Reuss, M. (Water Quality Institute, Hoersholm, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Literature on the different leaching methods for estimating the heavy metal content in coal fly ash was studied and is herein summarized. Attention is given to some of the practical problems which must be addressed in planning a leaching test. Strong acid digestion and several methods for the determination of total metal concentration are discussed. Results of leaching experiments with 6 different fly ashes are reported. Ag, As, Cd, Cr, Cu, Hg, Mo, Ni, Pb, Se, V, Zn, Na, K, Ca, and Mg were determined. These same metals were determined by atomic absorption spectrophotometry after both nitric acid and hydrofluoric acid digestion. The two digestion methods are compared.

43203 (CONF-8208123—, pp 377-382) **Use of "The Capillary Barrier" as a shield against ground-water pollution from fly-ash deposits.** Andersen, L.J.; Madsen, B. (Geological Survey of Denmark, Hydrogeological Division, Copenhagen, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

The enormous amounts of fly-ash produced by the burning of coal in power plants have resulted in a number of environmental problems, not least of which is the increased risk of groundwater pollution from its deposition in gravel pits. In order to prevent this pollution, fly-ash deposits have often been established with an underlying membrane. Such membrane-systems are quite expensive to build and necessitate besides a continous pumping and removal of percolate. The alternative of covering the fly-ash with a low-permeable membrane, which removes the infiltrated water laterally, prevents not only groundwater pollution but also the formation of percolate. By using the principle of "The Capillary Barrier", the low permeable membrane can be constructed of natural and resistant porous materials.

43204 (CONF-8208123—, pp 383) **Ash disposal at super thermal power stations in India.** Varughese, C.K.; Chakraverty, C. 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

43205 (CONF-8208123—, pp 384) **Fly ash production, utilization and disposal.** Mortensen, L. (ELKRAFT, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

43206 (CONF-8208123—, pp 385-394) **Prevention of water pollution by the use of fly-ash as a substitute for extracted raw materials.** Lyngvig, J. (The National Agency for the Protection of Nature Monuments and Sites, The Ministry of Environment, Copenhagen, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

The use of fly-ash as a substitution material for gravel and clay materials has to be regarded as a way of disposing of a waste product, as well as a way of saving the limited resources of natural raw materials, and also as a technical and economical innovation in the building and construction industries.

43207 (CONF-8208123—, pp 425-433) **Dust emission, its quantity and composition, depending on dust collector; coal quality etc.** Falster, H.; Jacobsen, L. (Danish Boiler Owners' Association, Soeborg, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Dust emission measurements have been carried through at Danish coal-fired power stations. Investigations show that modern electrostatic precipitators can meet Danish emission standards even for high resistivity ash. Modern electrostatic precipitators can reduce particulate emissions with a factor 10-20 compared to older precipitators. Trace metals that are very strongly attached to the finest particulates (As, Cd, Mo, Pb, etc.) show less reduction in emission.

43208 (CONF-8208123—, pp 543-553) **Chlorination of cooling waters-mechanism.** Sriraman, A.K. (Reactor Chemistry Section, Chemical Group, Bhabha Atomic Research Centre, Bombay, India). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

With the increasing demand for electrical energy, the trend is to build large thermal power plants, which need large volume of water to discharge their waste heat. Large scale chlorination of incoming coolant waters to combat biogrowth started in early twenties. However, the practice of chlorinating the potable water and waste water started much earlier. In this paper a survey is being made on the mechanism behind the chlorination of cooling waters, on the basis of available literature.

43209 (CONF-8208123—, pp 563-564) **Disposal of fly ash and wastewater using low-water hydraulic transport technique as a method for protection of surface and underground water from contamination.** Kmiecik, J.; Wilgusiewicz, Wl. (Power Industry Board of the South Region, Katowice, Poland); Leczny, M.J. (Environmental Pollution Abatement Center, Katowice, Poland). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

43210 (CONF-8208123—, pp 645-667) **Marine disposal of fly ash from coal fired power plants.** Hjelmar, O. (Water Quality Institute, Hoersholm, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

In order to obtain an evaluation of the environmental impact of a proposed artificial marine island of deposited fly ash a comprehensive research project has been carried out by the Water Quality Institute in cooperation with other institutes. The project involved a number of field investigations designed to yield the information required to predict emissions and ensuing ecotoxicological effects of such an island. This paper treats some project activities which were

performed in pursuit of data needed for estimating emissions from various stages of a marine ash island: Dry fly ash characterization, monitoring of operating ash ponds, investigations at old ash ponds, and laboratory leaching test. The results may be used to describe and evaluate emissions from various forms of marine ash disposal.

43211 (CONF-8208123—, pp 669-673) **Aquatic effects of wet ash disposal and wet limestone scrubber systems.** Ruane, R.J.; Milligan, J.D.; Young, R.C.; Chu, T.Y.J.; Olem, H. 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

At a 1000-MW coal-fired power plant of Tennessee Valley Authority (TVA) in US, approximately 700 tons of ash residues (fly and bottom ashes) produced by burning coal must be disposed of daily. Dry or wet handling and disposal are employed, depending on the availability of water, proximity of the disposal site, environmental regulations, and cost. The existing prevalent method for ash disposal is by wet sluicing to ash pond near the power plant. The average size of TVA ash ponds is about 75 square km which is 17 percent of the total area of the plant sites. TVA operates one wet limestone scrubber on a 550-MW unit at the Widows Creek Steam Plant. This paper summarizes TVA research on the major areas of concern for aquatic impacts in wet ash disposal and wet limestone SO_2 scrubbers, namely 1) monitoring efforts on ash pond effluents, 2) laboratory studies on coal ashes, 3) effects of coal-ash leachate on ground water quality, 4) investigation on scrubber sludges, and 5) toxicity of ash pond effluents.

43212 (DOE/ET/10373—T10) **Granular-bed-filter development program, Phase II. Final report.** Guillory, J.; Cooper, J.; Ferguson, J.; Goldbach, G.; Placer, F. (Combustion Power Co., Inc., Menlo Park, CA (USA)). May 1983. Contract AC21-77ET10373. 347p. NTIS, PC A15/MF A01. Order Number DE83014877.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The high-temperature moving bed granular filter (GBF) program at Combustion Power Company (CPC) commenced in 1977. Its purpose was to investigate, for the Department of Energy, the filtration performance of the GBF for application to coal-fired PFBC turbine systems. The GBF test system was successfully operated on 1500°F to 1600°F gases produced from an atmospheric pressure coal-fired fluidized bed combustor. Overall collection efficiencies above 99% and submicron collection efficiencies above 96% were consistently demonstrated in over 1500 hours of high-temperature testing. Alkali content of the hot gases was also measured to evaluate aluminosilicate additives for controlling alkali emissions. Operational and performance stability under upset conditions (ten times normal inlet loading and 125% of design gas flowrate) was also demonstrated experimentally. A computer-based GBF performance model was developed. It predicts overall particle capture within +- 5%. Gas flow streamlines and isobars are computer generated from theoretical principles and particle capture is based on the most recent empirical models. The effects of elevated pressure on efficiency and filter pressure drop are included in the model. A modular approach was adopted for GBF scale-up to commercial size systems using elements of the same size tested in this program. Elements can be readily packaged into 30,000 acfm modules at a projected equipment cost of approximately $27 per acfm.

43213 (DOE/FC/10182—T15) **Sulfate aerosols from western low-rank coal-fired boilers with FGD: summary of tests at Coal Creek, Clay Boswell, Milton R. Young, and San Miguel stations. MRI-83-FR-1849.** Markowski, G.R.; Downs, J.L.; Woffinden, G.J. (Meteorology Research, Inc., Altadena, CA (USA)). 31 May 1983. Contract AC18-80FC10182. 243p. NTIS MF A01. Order Number DE83014539.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The overall purpose of this study was to evaluate the primary sulfate emissions from utility boilers burning pulverized western subbituminous coal or lignite and equipped with flue gas desulfurization (FGD) wet scrubber systems. Of the four sites tested, all used spray tower absorbers for SO_2 control. At two sites, alkaline fly ash was the main FGD reagent (Fly Ash alkali process); at the other two sites the main reagents were lime and limestone, respectively. At three sites the scrubbers were preceded by electrostatic precipitators (ESPs) for particulate control. At one site particulate control was done by a venturi particulate scrubber within the FGD module. The results of the study indicate that the FGD wet scrubbers tested removed significant amounts of particulates and sulfate in addition to efficiently removing SO_2.

43214 (DOE/FE/15081—1) **Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982.** Shui, V.H.; Carlson, D.G. (Avco-Everett Research Lab., Inc., Everett, MA (USA)). Jun 1982. Contract AC01-81FE15081. 179p. NTIS MF A01. Order Number DE83013637.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

A process development unit has been designed for the purpose of demonstrating the feasibility of using an electron-beam (e-beam) processing system to remove sulfur oxides, nitrogen oxides and particulate matter from coal combustion gases. The maximum flue gas flow rate is 33,000 acfm at 300°F (about 10 MWe equivalent). The design included two specific sites, one in Indiana and the other in Kentucky.

43215 (DOE/FE/15081—T1) **Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983.** Shui, V.H.; Carlson, D.G. (Avco-Everett Research Lab., Inc., Everett, MA (USA)). Mar 1983. Contract AC01-81FE15081. 156p. NTIS, PC A08/MF A01. Order Number DE83013883.

Portions are illegible in microfiche products.

The proposed electron beam (e-beam)flue gas cleanup process development unit program has been analyzed to investigate methods of reducing total project cost.Two major program elements were analyzed in detail: (1) equipment and installation, and (2) test program. Results indicate that reducing the maximum design flow rate and shortening the test period can significantly reduce total project cost while still maintaining most of the original project goals.

43216 (DOE/MC/16049—T7) **Hot-gas cleanup system model development: status report.** (Flow Industries, Inc., Kent, WA (USA)). 17 May 1983. Contract AC21-81MC16049. 18p. NTIS, PC A02/MF A01. Order Number DE83011874.

This report describes work conducted during the period December 1, 1982 through April 30, 1983 as part of Task I of Phase II of the Hot-Gas Cleanup System Model Development. The scope of the status report includes (1) a brief summary of the accomplishments during this period, (2) budget expenditure to date, (3) planned task schedule through the contract expiration date, November 30, 1983, including major milestones, and (4) manpower and budget projection for the completion of the contract. The tasks accomplished to data are summarized below: the parallel plate electrostatic precipitator model has been coded, debugged, and delivered to METC; a report detailing the mathematical model of the parallel plate precipitator has been prepared and delivered to METC; a user's manual for the parallel plate precipitator has been prepared and delivered to METC; and all quarterly reports issued by Westinghouse on ceramic cross flow filter and fixed granular bed filter have been reviewed, and technical approaches to conduct modeling have been established.

43217 (DOE/MC/16441—1423) **Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983.** Green, D.A.; Leese, K.E.; Mack, K.L.; McMichael, W.J. (Research Triangle Inst., Research Triangle Park, NC (USA)). May 1983. Contract AC21-81MC16441. 109p. (RTI—2224/01-01F). NTIS, PC A06/MF A01. Order Number DE83014550.

Two methods of controlling byproducts of coal gasification processes were studied in laboratory-scale apparatus. Vapor phase cracking (VPC) was investigated as a means of eliminating heavy

organics from the hot gasifier exit stream by catalytic cracking. Wet oxidation was investigated as a means of eliminating phenolic compounds from the quench water used to cool the gasifier exit stream by catalytic oxidation in the aqueous phase at elevated temperature and pressure. In the VPC studies the activities of various coal-derived materials and commercial catalysts towards cracking model coal pyrolysates (such as phenol, naphthalene, and phenanthrene) were measured in the presence of simulated coal gasifier gas at 3.35 MPa and 600 to 1073 K. The most promising catalyst was a presulfided cobalt-molybdate, which almost completely eliminated phenol at 450°C in a space time of approximately 11 seconds. Steam present in large amounts in the simulated coal gas strongly inhibited the cracking activity of many catalysts evaluated. In the wet-oxidation studies, gasifier chars, supported metal-oxide catalysts, and homogeneous catalysts were tested at 3.55 MPa and 473 to 498 K. The supported copper-oxide catalysts were the best materials found for oxidation of phenol in water and in actual gasification wastewater. In the presence of 25 g/L of copper oxide on alumina catalysts, 92 percent of the phenolics, 64 percent of the chemical oxygen demand, and 58 percent of the total organic carbon were removed from slagging fixed-bed-gasifier wastewater 34-minute residence time.

43218 (DOE/MC/16547—1420) **Scale-up procedures for a Scheibel extraction column.** (Radian Corp., McLean, VA (USA)). 3 Jun 1983. Contract AC21-81MC16547. 83p. NTIS, PC A05/MF A01. Order Number DE83013576.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents a summary of the equations and relationships used to scale-up a Scheibel liquid-liquid countercurrent extractor column. These equations were obtained by using (1) certain assumptions deemed appropriate when treating process condensates from fixed-bed gasifiers and (2) published relationships specific to the scale-up of Scheibel columns. The scale-up procedure is based upon the removal of a key component using a polar solvent (single solvent extraction). Data were obtained from the GFETC pilot (6 inch diameter) column to generate an example scale-up calculation. The calculation used phenol as the key component. The solvent was diisopropyl ether (DIPE). The operation of the GFETC column serves to indicate that differential contactors may be used to effectively treat gasifier process condensates. To size (and cost) a large-scale unit, however, does require data generated from the specific type of unit to be used. Thus, the scale-up equations presented are specific to the Scheibel column. This scale-up procedure generates approximate dimensions and power requirements for the conceptual commercial-scale Scheibel extractor. The results can be used in rough cost estimates and in comparative studies with other conceptual large-scale extractor types (e.g. mixer-settlers) in order to select the most cost-efficient design(s).

43219 (EPRI-AP—3006, pp 30.1-30.10) **Solid waste management.** Francis, C.W. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Solid wastes generated at commercial coal gasification plants will represent the single largest waste stream requiring a long-term management strategy. These wastes can be divided into three general categories: coal preparation wastes; process wastes; and auxiliary and utility wastes. The waste management practices for these wastes will vary depending on: the waste characteristics; local, state, and Federal regulations; and economic conditions. For most gasification facilities, the solid wastes will be disposed of by land disposal, either in landfills or settling lagoons. The largest solid waste stream from coal gasification, ashes and slags, will likely be classified as a nonhazardous waste. The major concern in the disposal of ashes and slags in nonsecure landfills is not the acute toxicity of solid waste leachates. But rather, the concern is that the disposal of large volumes of wastes containing low concentrations of toxic contaminants will overtax natural attenuation or dispersal mechanisms that will result in accumulation of harmful quantities of these contaminants in surface and ground waters as well as other sensitive areas of the environment. Most leaching studies have been regulatory oriented, thus relatively little is known about the long term effects. A method to predict the rates of transport and effects of leachates needs to be developed. Little is known about the quantity or leaching characteristics of the various sludges derived from environmental control technologies. Tests also need to be initiated to evaluate the leaching characteristics, in terms of both organic and inorganic compounds, of the organic laden wastewater treatment sludges. The potential of known toxic and mutagenic organic compounds in gasifier wastewaters to migrate from these sludges under disposal environments should be clarified. Alternatives to land disposal of these organic sludges need to be developed.

43220 (NP—3770143) **Dirt management in Ruhr coal mines.** Adler, F. (Ministerium fuer Wirtschaft, Mittelstand und Verkehr des Landes Nordrhein-Westfalen, Duesseldorf (Germany, F.R.)). Dec 1981. 60p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770143.

The problem of mine dirt dumping in the densely populated Ruhr area has become a central problem of regional planning in the last few years. The mining industry as well as the responsible state authorities will have to consider the demands of the population, make new plans for dirt management in coal mines, and reduce the amount of dirt to be dumped. The authors intend to contribute to the discussion on how these demands can be met and under what conditions compact storing is possible in hard coal mines.

43221 **Coal conversion solid waste disposal.** Francis, C.W.; Boegly, W.J. Jr.; Turner, R.R.; Davis, E.C. *Journal of the Environmental Engineering Division (American Society of Civil Engineers);* **108**: No. 6, 1301-1311(Dec 1982). Contract W-7405-ENG-26.

From Energy in the man-built environment; Vail, CO, USA (Aug 1981).

The major solid waste produced at coal conversion facilities will be gasification slag or ash. To evaluate the impact of this waste on the environment, the Oak Ridge National Laboratory conducted extensive characterization and leaching studies on ash/slags that had been generated in bench-scale operations, pilot plants, and/or process development units for eight different gasification processes. These studies, designed to assess the consequences of disposal in landfills, showed that none of the leachates from these eight wastes exceeded the US Environmental Protection Agency's toxicity limits. Thus, these ash/slags would be classified as nonhazardous wastes. Quantities of polynuclear aromatic hydrocarbons (PAH) that were observed in the aqueous leachates of selected ash/slags were less than 1 μg/g and appear to be of no significant environmental concern. Column elution studies revealed effluents with pH values less than three and sulfate concentrations greater than 10,000 mg/L for wastes containing sulfur concentrations from 0.3 to 4%. As a result, the major environmental impact associated with disposal of these solid wastes appears to be the dissolution of sulfate and the potential acidification of ground water. 2 figures, 4 tables.

0109 Environmental Aspects

REFER ALSO TO CITATION(S) 43179, 43181, 43194, 43198, 43199, 43210, 43211, 43219, 43220, 43221, 43267, 43268, 44663, 44682, 44738, 44740

43222 (CONF-8205201—1) **Potential ecological hazards of H-Coal liquefaction.** Eddlemon, G.K.; Sigal, L.L. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 21p. NTIS, PC A02/MF A01. Order Number DE83014059.

From 16. annual conference on trace substance in environmental health; Columbia, MO, USA (31 May 1982).

In this study we identify, evaluate, and rank the potential ecological hazards posed by H-Coal liquefaction, one of several synfuel processes currently under development. Using estimated quantities and chemical compositions of aqueous, solid, and gaseous waste streams, we identified those wastes and their constituents most likely to enter surrounding ecosystems from a hypothetical commercial-scale facility. Contaminant concentrations in air, water, and soil were then estimated using dispersion and dilution models and known pollutant behavior. After comparing predicted exposure concentrations with toxicological and environmental benchmarks, we ranked the individual contaminants as well as the entire waste streams by their potential for ecological damage. Based on the mag-

nitude by which they exceeded designated benchmarks, cadmium in cooling-tower blowdown and atmospheric emissions, and aromatic amines in cooling blowdown and product spills ranked as the greatest potential hazards to receiving ecosystems and were categorized as probably concerns. Possible concerns included: mercury, arsenic, lead, phenols, and PAH's in cooling tower blowdown; and beryllium, arsenic, nickel, NO/sub x/, and SO_2 in atmospheric releases.

43223 (CONF-8208123—, pp 460-467) **Transport of airborne mercury emitted by coal burning into aquatic systems.** Brosset, C. (Swedish Water and Air Pollution Research Institute, Gothenburg, Sweden). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Concentrations of watersoluble and insoluble mercury compounds in air, precipitation and smoke from coal combustion have been measured. It has been found that in western Sweden 10-20 % of airborne mercury is in an oxidised watersoluble form. The corresponding figure from one boiler is approximately 70 %.

43224 **(DOE/ET/10386—T1-Vol.2) Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2.** (American Boiler Manufacturers Association, Arlington, VA). Aug 1981. Contract AC01-77ET10386. 347p. NTIS, PC A15/MF A01. Order Number DE81030265.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents the results of tests for polynuclear aromatic hydrocarbons (PAH) and inorganic trace elements in the effluent of eleven coal stoker fired boilers. These data are part of a larger stoker test program whose main objective was to produce information which will increase the ability of the boiler manufacturers to design and fabricate stoker boilers that are an economical and environmentally satisfactory alternative to oil and gas-fired units. The objectives of the SASS testing portion of this program are to determine the organic and inorganic makeup of boiler emissions which cannot be detected by using the standard EPA Method 5 train. SASS tests were conducted in accordance with EPA Level 1 guidelines. Twenty-three SASS tests were run on 11 different coal stoker fired boilers to determine emissions data for 74 inorganic trace elements and 21 PAHs. The emissions of most concern are the suspected carcinogens or the emissions with high probability of being carcinogens. The inorganic trace elements that were investigated and are listed as carcinogens and high probability carcinogens by the Office of Air Quality Planning and Standards are: arsenic, beryllium, cadmium, and nickel. The SASS emissions data are presented in three different sets of units: nonograms per joule of energy input, micrograms per dry standard cubic meter of flue gas sampled, and grams per kilograms of fuel input. To protect the interests of the host boiler facilities, each site has been given a letter designation. A complete description of each unit and all tests run at each site can be found in the corresponding site reports referenced at the end of this report. This report contains a description of the test equipment and procedures, analytical procedures, data reduction techniques, the test data, and a brief description of each facility tested and the coals fired. 4 figures, 16 tables.

43225 **(EPRI-AP—3006) Workshop on environmental control technology for coal gasification.** (Oak Ridge National Lab., TN (USA)). Apr 1983. Contract W-7405-ENG-26. 626p. (CONF-820791—). NTIS, PC A99/MF A01. Order Number DE83013068.

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Portions are illegible in microfiche products.

This report contains the Proceedings of the Workshop on Environmental Control Technology for Coal Gasification. The Workshop was sponsored by the Electric Power Research Institute and was developed by the Oak Ridge National Laboratory. Papers were presented in six sessions covering a broad range of topics and representing the work of interested groups in the United States, India, South Africa, and the Federal Republic of Germany. Topics covered include EPA's views on pollution control requirements, health and environmental effects, project development, gasification plant operating experience. A Summary Discussion and Perspectives by members of the workshop Planning committee at Oak Ridge Natioonal Laboratory are also included. Twenty papers in this Proceedings have been abstracted and indexed for the Energy Data Base.

43226 (EPRI-AP—3006, pp 6.1-6.44) **Environmental pollution control research activities.** Witmer, F.E. (Dept. of Energy, Washington, DC). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The Environmental Control Technology Division (ECT) was established by the Assistant Administrator for Environment to provide advice and technical judgment on the adequacy of the pollution controls that accompanied new and improved energy systems. The initial activity of the ECT Division was directed at assessing the environmental readiness of those coal conversion processes considered nearest to commercialization. Later the ECT program shifted from assessment to research when pollution control technology was judged capable of meeting the environmental standards that existed in 1979. The research effort that evolved addressed the following: (1) wastewater treatability/reuse (trace polynuclear aromatic hydrocarbons and trace elements); (2) solids and sludge disposal; (3) acquisition of confirmatory pollution control performance data; (4) new and improved pollution controls. As a result of the DOE-wide deemphasis of fossil energy technology demonstration activities, the Office of Budget and Management FY 1983 guidance has indicated that the assessment and research function of the ECT Division should cease to exist. Many of the research areas initiated by the ECT program are in the process of being picked up by DOE's Fossil Energy and/or industry. Recommendations for continued research are for: (1) extended performance and engineering data base - long-term operation of reference pollution controls; (2) systems approach - mine-to-end use, including multimedia environmental tradeoffs; (3) water reuse/recycle, by-product considerations and salt disposal; and (4) continued R & D on improved/more cost-effective pollution controls. 21 figures, 12 tables. (ATT)

43227 (EPRI-AP—3006, pp 8.1-8.19) **Health effects studies.** DeMarini, D.M. (Oak Ridge National Lab., TN); Epler, J.L. Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The Oak Ridge National Laboratory has developed a wide-ranging, multiple-discipline program in the health effects of energy-related pollutants. The major goal of this research effort is to provide a means of testing health effects of those compounds produced by various existing or proposed methods of energy generation. These compounds include the primary effluents of existing fossil fuel sources such as sulfur dioxide, the oxides of nitrogen, ozone, hydrocarbons, and heavy metals, as well as products of newly proposed methodology such as coal liquefaction and of auxiliary methodology such as cooling-tower additives. The work is divided into two phases: one dealing with known compounds expected to occur in the environment through energy production, conversion, or use; and another dealing with actual samples from existing or experimental processes. To approach the problems of testing large numbers of compounds, we set up a battery of mutagenicity assays. Research units utilizing Salmonella, Escherichia coli, yeast, human leukocytes, mammalian cells, and Drosophila have been initiated. Parallel efforts using teratogenic and carcinogenic endpoints with both short- and long-term biological assays have been developed. As a working list we have looked to those compounds expected to occur in fossil fuel production or conversion. Many of these compounds are polycyclic hydrocarbons and require metabolic activation by mammalian enzymes. Basic and neutral fractions from crude oils are mutagenic in the microgial systems. Comparative studies with leukocytes, mammalian cells, and Drosophila validate these results. The assays represent rapid tests for potential biohazards. 3 tables.

43228 (EPRI-AP—3006, pp 11.1-11.29) **Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa.** Partridge, L.J.; Alexander, A.T. (AECI Ltd., Transvaal, South Africa). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

In almost eight years of operation, no fundamental environmental or occupational health problems have arisen on the Modderfontein coal-based ammonia/methanol plant. The gas from the Koppers-Totzek gasification process is relatively free of contaminants, with the result that liquid effluent from the gas-cleaning process has met standards without the need for specific treatment measures. It has been possible to control gaseous emissions from the plant within acceptable limits. However, dust concentrations in the exhaust flue gas from the coal milling plants has been higher than the design level, owing to a number of contributory factors. The most significant environmental effect has been the considerable land area required for disposal of gasifier fly ash. A market for this material has not been identified, but plans are well advanced to utilize the fly ash in a fluidized-bed boiler to produce factory utility steam. This project offers the possibility of reducing the volume of ash considerably. 2 figures, 12 tables.

43229 (EPRI-AP—3006, pp 12.1-12.18) **Texaco coal gasification process: leach characteristics of slags.** Skarlos, L. (Texaco, Inc., Port Arthur, TX). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Slag wastes resulting from the Texaco Coal Gasification Process (TCGP) in which Illinois No. 6 and Western Bituminous coals are used because the feedstocks would be classified as nonhazardous based on the EPA Extraction Procedure (EP) test results and on the EPA Resources Conservation and Recovery Act (RCRA) standards for determining a hazardous waste. This conclusion is supported by additional information gathered from the application of the proposed ASTM Leaching of Waste Materials Method and the ORNL Intermittent Flow Column Test on these slags. In addition, the EPA EP Test indicates that the slags isolated from the TCGP contain lower levels of soluble metals than those found in the fly and bottom ashes collected from a coal-fired boiler in which Illinois No. 6 coal was used as feed stock. Ashes from coal fired boilers are considered nonhazardous wastes and are excluded from regulation under RCRA. High levels of sulfate in the coal slags as indicated by the Intermittent Flow Column Test may become a matter of concern in the disposal of these slags. Since the sulfate problem is probably a function of the sulfur content of the coal, low-sulfur Western coals should not present any significant problems. 6 tables.

43230 (EPRI-AP—3006, pp 13.1-13.31) **Environmental issues in planning a medium-Btu coal gasification plant serving industries: a case history in Philadelphia.** Stringer, R.P.; Litman, R.; Escott, J.J.; Rutkowski, M.D. (Gilbert Commonwealth Assoc., Reading, PA). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Environmental issues considered are: site selection; public attitude; regulatory impact on design of water, air, and solid waste control systems; and environmental permits. Public reaction to the site selected for the project was initially not favorable. However, this attitude changed after community leaders visited an operating industrial coal gasification plant in Pennsylvania. The GKT entrained bed, oxygen-blown, gasification process was selected for the project because it is a commercially proven system and because of its positive environmental characteristics. Applicable environmental regulations were identified, and the design incorporated pollution control features which are believed to be sufficiently stringent to satisfy these regulations. The major air emission is fugitive coal dust, which should be adequately controlled through the use of devices such as liquid sprays, bag house filters, and covered conveyors. The major unanswered questions concern potential nuisance odors or toxic gases being discharged from vents and flares. Wastewater will be discharged to the Delaware River after onsite physical chemical treatment. Slag and fly ash solid wastes will be removed from the facility and disposed of in a permitted landfill. Pure elemental sulfur recovered from the product gas will be sold. A major question concerns the leachate properties of slag and ash resulting from gasifying eastern bituminous coal. 3 figures, 6 tables.

43231 (EPRI-AP—3006, pp 15.1-15.21) **Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers.** Lienhard, H. (Lurgi Kohle, Frankfurt, Germany); Winkler, G. Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

This paper discusses an overall plant design applying downstream processes that act as environmental control technology (ECT), thus minimizing costs and complexity and maximizing the environmental acceptability of the plant. Furthermore, the influence of ECT on plant and product costs are shown for some cases. In applying the British Gas Corporation/Lurgi slagging gasifier and a new combination of downstream processes, a new fuel gas concept for the production of fuel gas has been chosen for discussion. The basis for this concept is a plant that is self-supporting. Only coal, raw water, an electricity have to be supplied to the plant. The concept includes the following process areas: gasification; acid gas removal; claus sulfur recovery; gas liquor treatment; gas liquor incineration; boiler house; and oxygen plant. As shown in the flow diagram, only three by-products are leaving the battery limits: (1) elemental sulfur; (2) coal minerals; and (3) slag. All other by-products are either routed back to the gasifier for extinction (like dust, tar, and oil) or destroyed by thermal combustion in the incinerator (like phenols, fatty acids, ammonia, etc.), thus increasing the overall efficiency of the plant. The data and information shown in this paper demonstrates very clearly that ECT is available commercially and does not present any technical risk. The degree to which the environmental impact of a plant will be limited depends primarily upon the amount of money a society is prepared to spend for this protection. 11 figures.

43232 (EPRI-AP—3006, pp 16.1-16.26) **Environmental issues and research program data needs suggested by the results of the Kosovo test program.** Corbett, W.E.; Magee, R.A. (Radian Corp., Austin, TX). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The conclusions and recommendations derived from an analysis of the results of the Kosovo test data and the pollution control processes which are candidates for use in a US Lurgi-based plant can be summarized as follows: (1) pollution control processes for all of the key Kosovo plant discharge streams are commercially available; (2) while these pollution control processes are commercially available, numerous minor and trace components found in the discharge streams from the Kosovo gasification plant can impact the performance of these controls. Because many of these components may be unique to gasification technology, the applicability of pollution control design practices used in other related industries must be demonstrated; (3) pollution control costs will add significantly to the cost of a base (i.e., one without controls) synfuels plant. The control of discharge streams by recycling or process modification should be considered in the early phases of the plant design, since significant cost savings for pollution control equipment can be realized; (4) every gasification facility will have unique discharge stream characteristics resulting from differences in coal feedstocks, plant configuration and process operation. Also, it is important that pollution control process designs consider worst case transients as well as normal operating conditions. For these reasons, tests designed to obtain yield data and design parameters for a specific coal feedstock should include provisions for characterizing discharge streams at both steady-state and transient conditions. This work is needed to provide a sound basis for pollution control process design. 3 figures, 8 tables.

43233 (EPRI-AP—3006, pp 20.1-20.20) **Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli.** Ramaswami, S. (Neyveli Lignite Corp., Ltd., Tamilnadu, India). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The Neyveli Lignite Corporation, an undertaking of the Indian government, operates a gasification plant consisting of three Winkler generators to gasify locally mined lignite at the rate of 1000 t/d. The lignite is dried to a moisture content of about 8% and has a calorific value of 5250 kcal/kg. The gas that is generated during plant operations is used for the synthesis of ammonia, which is further processed to obtain urea fertilizer. A schematic diagram of the Winkler gasifier is presented. Dust, waste water, gaseous wastes and solid waste control methods are discussed. The industrial units at Neyveli are situated in a large open area; all plant locations are well ventillated; pollutants are dispersed at a sufficient height. No serious atmospheric pollution problems have been experienced in Neyveli. The State Government of Tamilnadu has taken samples of effluents from the plant for analysis to ensure the plants compliance with the discharge specifications of industrial effluents into surface waters. The Winkler plant was designed in 1960 and was commissioned in 1965. At present, a modern 1500-t urea plant using lignite as the raw material for gasification is being planned. For this, EPRI/ORNL's assistance will be sought to supply the latest technology available on environmental pollution. 5 figures, 1 table.

43234 (EPRI-AP—3006, pp 21.1-21.23) **Westinghouse fluidized-bed gasification process applications: environmental considerations and controls.** Voytko, J.D.; Keairns, D.L.; Roffman, H.K. Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Development of Westinghouse gasification technology began in the early 1970s. The first stage included laboratory studies and analytical work. The second stage involved design of the 25-ton/day Process Development Unit (PDU). The PDU unit has logged more than 7000 h of operation and testing. Results have demonstrated that virtually any kind of coal can be processed - caking or noncaking, high- or low-ash, high- or low-sulfur, highly or slowly reactive. Two of the possible applications presently considered for this gasifier are: (1) combined cycle for power production; and (2) coal gasification for methanol production (The Keystone Project). Environmental testing was conducted at the PDU, and environmental testing of PDU solid wastes was also performed. Potential applications of the Westinghouse gasifier are discussed briefly, and environmental permitting studies for the Keystone Project are described to illustrate the ongoing effort to bring this technology to the commercial phase. Since gaseous and liquid effluents are presently being characterized, the main emphasis of this paper is in describing the solid waste characteristics and the applicable permitting aspects of the Keystone Project. The general conclusions of this investigation were: (1) residues from this gasification process, including the ash agglomerates and the PDU quench-scrubber sludge, are non-hazardous, based on test results from a variety of process residues; (2) residue disposal will not be an obstacle to the commercialization of the Westinghouse process. 5 figures, 3 tables.

43235 (EPRI-AP—3006, pp 23.1-23.48) **Impact of process design on effluent control technology needs in coal gasification.** Nakles, D.V.; Fillo, J.P. (Environmental Research & Technology, Inc., Pittsburgh, PA). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The objective of this paper is to identify process/environmental relationships which have the potential to influence control technology needs. This is accomplished in three steps. First, baseline control technology requirements are defined for a coal gasification facility, based on applicable emission limitations and the nature of the uncontrolled emissions. With this baseline defined, process factors that influence the production and/or distribution for the major pollutant species are identified. Finally, the impacts of selected factors on baseline control technology requirements are discussed using a case-study analysis of an integrated gasification/utility boiler facility. Process design can be a major factor in determining control technology needs for coal gasification facilities. These process considerations have the potential to eliminate the need for control entirely, or at the very least, to influence the type and extent of control required. Obviously, however, the examples and analyses presented must be put in context with the overall process objectives and economics of the facility. Furthermore, multimedia environmental considerations, which could not be addressed in this paper due to space limitations, must also be considered. If this is done correctly, the commericalization of a cost-effective, environmentally acceptable synfuels industry can be achieved. 16 figures, 9 tables.

43236 (EPRI-AP—3006, pp 24.1-24.21) **Coal liquefaction and heavy oil conversion minimizing of environmental impact results from Veba Oel prefeasibility study.** Goethel, G.F.; Klein, W.; Hosang, H. (Veba Oel AG, Gelsenkirchen-Buer, Germany). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

VEBA OEL's study leads to the following conclusions as far as environmental aspects are concerned: (1) pollutant emissions can be considerably reduced or nearly eliminated by optimization of the process; (2) the hydrogenation plant can be built to operate within the present framework of the legislative and regulatory systems; (3) the composition and quantity of the waste materials leaving the plant can be maintained by strict adherance to the process parameters; (4) the emissions of a hydrogenation plant from all sources can be minimized to such an extent that they meet the regulatory limits. No insurmountable problems are expected with respect to the protection of the environment or other technical matters which could prevent the construction of a commercial-size plant for the hydrogenation of coal or heavy oil; (5) a prequisite for the realization of such a plant is the support of Federal and state governments in Germany and their willingness to create favorable political and economical conditions. It is also imperative that the population concerned accept a plant of such dimensions in their area. A lot of educational work will have to be done by politicians and industry to meet that aim. 13 figures.

43237 (EPRI-AP—3006, pp 29.1-29.5) **Environmental control technology for aqueous effluents.** Klein, J.A. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The following conclusions have been drawn from the information presented at this workshop: (1) regulations for the discharge of treated aqueous wastewaters (or the prohibition of discharge) cannot be completely known a priori and will need to be determined through consultations between the process developer and the local and federal regulators. These regulations will probably be site-specific; (2) adequate technology now appears to be available to treat coal gasification wastewates sufficiently to ensure compliance with currently anticipated regulations; (3) public perception of the adequacy of the effectiveness of environmental control technology will probably be more important than the actual level of efficiency. It is crucial to work effectively and early with the local public; (4) at present, it appears prudent to include a large amount of conservatism in the design of necessary aqueous control technology. This may be costly; (5) the need to design a zero-discharge option has not been satisfactorily determined. This option may be site- and process-specific, depending on the local public awareness, and will be determined in consultation with regulatory bodies; (6) cost and efficiency trade-off studies between the various control technologies need to be completed before a rational approach to optimizing a control flow scheme can be effected; (7) a number of advanced technologies will probably prove to be more effective and reliable than existing proposed technologies. Actual efficiency and cost parameters for these advanced technologies will need to be determined before decisions and, in some cases, regulations can be made concerning the control technologies of choice.

43238 (EPRI-AP—3006, pp 31.1-31.4) **Environmental control technology for gaseous emissions.** Singh, S.P.N. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The following conclusions appear to emerge as a result of the Workshop: (1) gaseous emissions from potential coal conversion plants appear to be the least worrisome of the plants' emissions. It appears that current environmental control technology practiced in allied industries will be able (or can be satisfactorily modified) to adequately control the release of gaseous effluents. However, the reliability of these technologies for use in coal conversion plants needs to be established; (2) the EPA appears to have a conciliatory, rather than dogmatic, position and seeks cooperation from industrial developers in setting adequate but reasonable regulations; (3) the results of the pre- and post-Workshop questionnaires indicate that: additional characterization and health and environmental effects data on gaseous effluents are needed, although the data needs are not of a critical nature; current technology is available (or can be adapted) to adequately control the release of atmospheric pollutants from coal conversion plants.

43239 **(Juel—1815) Emissions from coal utilization facilities and possible abatement measures.** Huber, W.; Allhorn, H.; Birnbaum, U. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung). Nov 1982. 215p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83751078.

Portions are illegible in microfiche products.

In view of the expected increasing application of coal and coal products to cover energy requirements, a consideration of emissions released from coal mining and utilization facilities is of particular interest. Starting from a discussion of the technical bases, possible emission sources for the most important processes will be determined, in which connection electricity generation and coal refining form the main priorities. The representation of possible measures to reduce emissions, as well as emission data available in the literature, indicates future alternatives for taking action in the employment of the various exploitation procedures.

43240 **(KFK—3523) Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1.** Juentgen, H.; Heek, K.H. van; Hewing, G.; Klein, J.; Peters, U.; Schroeter, H.J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse). Apr 1982. 132p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83751079.

Portions are illegible in microfiche products.

In this report, first the market potentials and the time horizon for market introduction of coal gasification and liquefaction are discussed. The basic concepts of coal gasification and liquefaction are described, followed by a discussion of the environmental impacts of coal conversion. For gaseous emissions, estimates are presented. A further section of this report deals with the problem of waste water treatment. The report is preceded by a summary version.

43241 **(NILU-TR—15/81) Determination of human exposure using measured data of Cd, As and Pb.** Pacyna, J.M.; Sivertsen, B. (Norsk Inst. for Luftforskning, Kjeller). Dec 1981. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750785.

Portions are illegible in microfiche products.

The dietary intake and human exposure of Cd, Pb and As were estimated based upon data taken near a coal-fired power plant in Poland. The use of compartment models for estimating total human exposure has been demonstrated, and values of transfer factors were compared with data from the literature. 2 drawings, 15 tables.

43242 **(SNV-PM—1493) Hydrological environmental consequences of peat extraction. Preliminary study.** Nilsson, L.Y.; Johansson, T. (Statens Naturvaardsverk, Stockholm (Sweden)). 1981. 52p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750770.

Portions are illegible in microfiche products.

Peat extraction for energy production leads to negative consequences on water systems. The work here presented is based on studies of Swedish and foreign literature and minor field experiments concerning the effects of peat extraction on surface and ground water as regards changes in water balance and water quality. The conclusions are formulated as short hypothesis as follows: Negative effects on the water environment affects primarily the water quality. The consequences are higher acidity, higher content of dissolved heavy metals and higher turbidity in the water system. Changes in water balance due to peat extraction are smaller than the natural fluctuations in discharges and water levels. It is important to test this hypothesis during actual peat extraction activities.

0110 Reserves And Exploration

REFER ALSO TO CITATION(S) 43251

43243 **(ESC-WR—82-14) Coal exploration in the Netherlands. A research proposal.** Boswinkel, H.H. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). 1982. 21p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Coal mining in the Southeast of the Netherlands would be possible, if the exploitation at depths of 1,000 m, 2,000 m or 3,000 m could technically be performed. A description of the different mining techniques are given. Special attention has been given to a proposed study of coal gasification in the underground with respect to the economics.

43244 **(NE-SBT—82-10) System for the investigation of peat bog by radar. Final report. Stage 2.** Bjelm, L.; Ulriksen, P. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1982. 132p. (In Swedish). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750778.

Portions are illegible in microfiche products.

The preliminary investigation of peat bog is facilitated by the use of radar. The continuous radar profiles make it possible to calculate the thickness of peat. An area of 240 ha has been investigated in less than 2 days by means of radar profiles 100 m apart. The extent can be presented on maps and the distribution of the variation of humification is computed. A 80 MHz antenna gives the best results even when it is mounted 60 to 70 cm above the ground. The results can also be used for the restoration of the landscape after the exploitation of peat moors. When using a scooter for prospecting a computer can mounted on it and the evaluation of the results made on the spot. Tests were performed using helicopter for surveying. The results were inferior to ground surveys. The wet northern moors can be damaged on the surface when using scooters. To avoid this, traffic should take place when the ground is frozen or covered by 15 cm of snow.

43245 **(NP—3750846) Brown-coal reserves of Denmark. Report of phase 1.** Grambo-Rasmussen, A. (Danmarks Geologiske Undersoegelse, Copenhagen). Jan 1982. 39p. (In Danish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750846.

In Middle and Western Jutland brown-coal exploration boreholes were drilled systematically. Results are registered by the Danish Geological Survey. By means of computer a map of brown coal deposits localization and abundance is plotted . Reserves are evaluated by deducing the recovered quantity from the total brown-coal deposits. Evaluation of brown-coal recovery, its economy and energy value will be presented in the next phase of this project. The whole project is supported by the Energy Research Programme of the Danish Minsistry of Energy.

43246 **(NYSERDA—82-25-Vol.2) State of New York peat-resource inventory. Volume II.** (Carlson and Sweatt - Monenco, Inc., New York (USA)). Jul 1982. Contract FG01-81FE05110. 413p. NTIS, PC A18/MF A01. Order Number DE83014379.

A comprehensive peat resource inventory of New York State has been prepared based on airphoto interpretation supported by field reconnaissance and detailed surveys of certain selected peatlands. The entire state, with the exception of the Adirondack Park and a number of other protected areas, was included in the study. A total of 872 peatlands were identified, of which 235 individual deposits were judged usable for peat mining, based on crite-

ria presented within the text, and then mapped using airphotos. The study shows that the state has over 145,910 acres of peatland containing an estimated 336 million tons of peat (at 50% moisture content) located in deposits which may be technically mineable. However, various other factors, such as ownership, location in park or wildlife management holdings, and existing uses, may exclude some of the otherwise potential deposits from possible use. Section 1 of Volume 2 contains all the bore hole logs compiled in the field during the detailed and reconnaissance surveys. This data was not included in the main report due to bulkiness and the fact that the data can be regarded as semi-raw field information which has been used as a partial basis for the resource calculations, included in Volume 1. The details on the information codes contained in the bore hole logs are explained in Section 3, Volume 1, pages 3-6.

0120 Mining

REFER ALSO TO CITATION(S) 43188, 43243

43247 (BMFT-FB-T—83-031) Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines. Czauderna, N. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 256p. (In German). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83751037.

Portions are illegible in microfiche products.

Implementation, documentation and submission of systems analysis on the development and introduction of an integrated control and monitoring system for electrical installations and machinery used in underground hardcoal mines. The studies are structured as follows: 1. Status analysis of the present-time mine with its weak points. 2. Concept of an integrated control and monitoring system during the different phases of evolution, introduction, and utilization in the mine of the future. The studies were evaluated, correlated, and the concept of a control and monitoring system in a partially automated mine was set up. As an approach to an eventual solution it was concluded that with the introduction of process automation in any and all sectors of underground mining and the concentration of these sectors in an overall system thanks to recent data transmission concepts, the technical, organizational, and economical operations of a mine could be substantially improved. To this end an automation system was designed according to the principle of full utilization of market-economical potentials with defined standard interfaces and standard modules. This concept is to form the basis of an overall standardization, after detailed discussion with users, producers and authorities. Due to the fact, that the project had to be interrupted prematurely along with the submission of studies, the other scheduled work parcels, e.g. development, trials, and fullscale tests, could not be carried out.

43248 (DOE/ET/12478—T1) Analysis of the applicability and probable cost effectiveness of advancing longwall mining systems in the United States. Final technical report. Hill, F.E.; Peake, C.V.; Sharkey, A. (Ayers (Emory) Associates, Inc., New York (USA)). Jul 1981. Contract AC01-77ET12478. 193p. (FE—9061-1). NTIS, PC A09/MF A01. Order Number DE82002424.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

In the first phase of this study it was concluded that there are a number of advancing longwall systems that might well be applicable in the United States and, furthermore, meet the health and safety requirements of MSHA, state inspectors, operating management, and unions. Comparative analyses showed that only two of the advancing-type systems evaluated in the Phase I report failed to approach or better, economically, the typical retreating method in at least some conditions; the others appeared to warrant further attention. And if the mining plan could be worked out to allow for a switch from advancing to retreating after the early years of mining, then almost any combination of advancing and retreating would provide a better return on investment, or in our terms, have a higher net present value than would a typical retreating system. The reason for this lies in the higher initial production rates of the advancing systems and in the lower operating cost and higher ultimate productivity of a retreating system once it is established. After analyzing the advantages and disadvantages of the various advancing longwall systems for a trial program it became apparent that the modified Z System offered the best combination of economic potential and lack of conflict with US mining laws. The major attraction of the modified Z system is that it provides separate roadways to the face for intake air, exhaust air and a beltway. Thus regulatory approval of the ventilation system should not be a major obstacle. The Kaiser Steel Corporation agreed to cooperate with the development of a specification for a trial of the system at its Sunnyside Mine in Utah. The specification was developed for one longwall face to mine a series of panels at Sunnyside.

43249 (DOE/MC/10737—1436) Demonstration project for methane recovery from unmineable coalbeds. Final report. Allred, L.D. (Mountain Fuel Supply Co., Salt Lake City, UT (USA)). Aug 1982. Contract AC21-79MC10734. 344p. NTIS, PC A15/MF A01. Order Number DE83015280.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Mountain Fuel Supply Company is a publicly-owned, gas-utility company with extensive natural gas production, pipeline, and distribution facilities in Utah and Wyoming. Through its subsidiary Mountain Fuel Resources, an active research program is being conducted under which various nonconventional sources of pipeline gas are being investigated. As part of this program, a jointly funded project was initiated with the US Department of Energy to show the potential for commercial recovery of methane from deep, unmineable coalbeds. The Book Cliffs coal field located in central Utah was selected as the site of the demonstration project. This coal field is known for its high methane emissions. Numerous projects have been initiated or conducted in this coal field over the past several years. These projects have drilled vertical wells as well as horizontal boreholes from within existing mines in the area. A Bureau of Mines report noting the locations of high methane concentration coalbeds also mentions the Book Cliffs coal field. Figure 1, which was reproduced from this report, shows the counties in which coalbeds are located that emit in excess of 1 MMcfd of methane into mine ventilation systems. These counties are located in the states of Pennsylvania, West Virginia, Kentucky, Alabama, Illinois, and Ohio in the eastern part of the country, and in Utah and Colorado in the West. The Utah Geological and Mineral Survey has also been conducting extensive studies relative to the methane production from Book Cliffs coals. Since 1975, they have been measuring the methane content of core samples. Data have been accumulated from over 200 core samples. Methane contents ranging up to 350 scf/ton have been reported.

43250 (DOE/OR/00033—T6) Drilling and blasting techniques and costs for strip mines in Appalachia. Aimone, C.T. (Northwestern Univ., Evanston, IL (USA). Mineral Resources Engineering and Management Program). Jun 1980. Contract AC05-76OR00033. 73p. NTIS, PC A04/MF A01. Order Number DE83015147.

On-site investigations of blasting techniques were conducted at twenty surface coal mining operations in the steep slopes of Appalachia. The mine sites represented a range of mountain mining methods and annual coal production levels; all sites used similar techniques and equipment for the removal of fragmented waste rock. Hole loading characteristics and constraints limiting blast designs were observed at each mine site. This report summarizes technical blasting data and geological conditions which require special design considerations. Three mine sites were selected for future research in fragmentation efficiency. Detailed economic data on drilling and blasting were gathered from the three research sites and are reported herein. A great deal of fragmentation difficulties stem from tough, unpredictable geology with specific bedding characteristics and local zones of defined structural weaknesses such as jointing and vertical seams. Exceptionally hard bedrock, existing as a caprock or as the basal layer above the coal seam, persists as the cause of oversize rock breakage or, in the latter case, damage to the coal unless special precautions are taken. Federal blasting regulations strictly control the amount of explosives used as well as throw of the fragmented rock. This requires that blasting modifications be employed. The nature and extent of blast modifications were observed to be related to terrain and demographic conditions around the mine site. Drilling and blasting costs reported for the

three mine sites averaged $0.21 per cubic yard of material blasted. Drilling costs varied widely, as drilling time was indicative of geologies and often, drilling costs remained the greatest percentage of total blasting and drilling costs.

43251 **(NP—3770006) Development of the seam.** Gallhoff, U. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 20 Nov 1980. 152p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770006.

Portions are illegible in microfiche products. Thesis.

A kind of stock taking is carried out in order to describe the development, state and special features of development of seams. Development in the rock and development of the seam are compared in terms of cost. A model study shows the field of application of development of the seam and its cost, its positive and negative sides.

43252 **(PNL-SA—9661) Reclaiming mined lands in arid environments.** Sauer, R.H. (Pacific Northwest Lab., Richland, WA (USA)). Sep 1981. Contract AC06-76RL01830. 22p. NTIS, PC A02/MF A01. Order Number DE83013999.

Portions are illegible in microfiche products.

An increasing amount of coal is likely to come from western surface mines where the thick seams are within a few hundred feet of the surface, and the growing seasons are hot and dry. An unconventional approach to the restoration of vegetative cover on mined lands in the dry western United States has been developed under Department of Energy sponsorship at the Pacific Northwest Laboratory. In this paper, the problems associated with reclamation in arid regions are first discussed, followed by a description of PNL's approach to restoration. The paper concludes with recommendations on applications and research in the PNL approach to reclamation. In PNL's approach, irrigation water so necessary for successful reclamation is supplied by water harvesting. Water harvesting, the gathering and storing of rainfall and snowmelt runoff, has been used since antiquity in arid regions to supply domestic and irrigation water. PNL's approach uses the slopes of the partly leveled and smoothed spoil banks to intercept precipitation and direct runoff to the valley floors at the bases of the slopes where the crops are cultivated. The runoff is stored in the soil and is used for irrigation.

0130 Transport And Handling

REFER ALSO TO CITATION(S) 43167, 43168, 43178

43253 (CONF-8208141—, pp 192-206) **Otisca T-Process: a new coal beneficiation approach for the preparation of coal slurries.** Keller, D.V. Jr. (Otisca Industries, Ltd., Syracuse, NY). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

During the investigation of the various procedures for gravity separation of coal, Otisca developed a rather simple procedure for the determination of the pure mineral matter content released during size reduction. The procedure involved a simple agglomeration of the carbonaceous material from a water slurry using one of the fluorochlorocarbons. The Otisca T-Process consists of three steps: raw coal particle size reduction into the range of 15 μm x 0, the agglomeration-separation of the product coal from the mineral matter which remains dispersed in the water phase, and the complete recovery of the chlorofluorocarbon agglomerant for recycling in the process. The product coal is recovered at nearly 100% Btu recovery and leaves the plant with less than 1 wt % ash and 100 parts per million agglomerant. The moisture content of the product can be varied from less than 8 wt % to over 30 wt % depending on whether or not a dry powder or coal-water slurry is desired. A two hundred pound per hour pilot plant is now in start-up as supported by Fuel Supply Service, Inc., a subsidiary of Florida Power and Light Company of Miami.

43254 **(PNL-SA—9720) Modelling and control of blackwater treatment in coal preparation.** FitzPatrick, J.A.; Vallario, R.W. (Northwestern Univ., Evanston, IL (USA). Dept. of Civil Engineering; Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 37p. (CONF-810520—8). NTIS, PC A03/MF A01. Order Number DE83015091.

From Symposium on separation science and technology for energy applications; Gatlinburg, TN, USA (5 May 1981).

Portions are illegible in microfiche products.

Blackwater streams emerging as effluents from coal-preparation plants typically contain considerable coal values which are rejected with waste solids. Additionally, new and proposed environmental regulations severely limit the use of coal-refuse ponds and encourage closed water circuitry. Optimization of flotation cells and thickening units to overcome these limitations has not been successful in most cases. Models are chosen here for simulating the two processes and examined from a theoretical and practical standpoint in application to coal-preparation problems. The emphasis of this analysis is to provide a rational basis for unit process control through proper model selection and application. Strengths and weaknesses of model approaches and developmental needs are also reviewed. 4 figures, 6 tables.

43255 **(PNL-SA—9981) Experimental investigation of interfacial shear in large-particle-coal hydrotransport.** Barnhart, J.; Eyler, L.; Lombardo, N. (Pacific Northwest Lab., Richland, WA (USA)). Oct 1981. Contract AC06-76RL01830. 31p. (CONF-820512—2). NTIS, PC A03/MF A01. Order Number DE83014980.

From ASME material handling conference; Houston, TX, USA (16 May 1982).

Recent efforts in coarse-particle hydrotransport modeling include the development of a physically-based model that separates the particles into two components - suspended load and contact load. The analyses of the two components are coupled by interfacial shear resulting from the components' differing bulk velocities. In support of these modeling efforts, the interfacial friction factor for water flowing in a pipe over well-characterized coal beds was evaluated experimentally. Experiments were conducted in a 32.5-m long, 16.4-cm ID Plexiglas pipe. Coal samples of anti d/D = 0.05, 0.10, and 0.20 were placed inside the pipe at three different bed depths. Pressure taps at four axial locations measured the pressure drop as water flowed over the bed. This paper describes the apparatus, experimental and data-reduction procedures, and the results achieved. A correlation of interfacial friction factor in terms of average particle diameter suitable for modeling purposes is presented.

43256 **Analytical instruments in the coal preparation industry: current status and development needs.** Klatt, L.N. (Oak Ridge National Lab., TN). *ACS Symposium Series;* No. 205, 259-279(1982). Contract W-7405-ENG-26.

The expanded use of domestic coal supplies as a substitute for imported petroleum will require significant expansion and modernization of the coal preparation industry. The Oak Ridge National Laboratory has assembled a multidisciplined team to study the needs of this industry and to undertake a development program with the goal of improving the efficiency and practice of coal beneficiation. Automated on-line analytical instruments are key elements in accomplishing this goal. On-line ash monitors are commercially available and have been successfully used in coal preparation plants worldwide. On-line sulfur meters, based upon prompt neutron activation analysis, have been developed. These systems can be modified to determine ash and calorific value. A moisture monitor, based upon microwave attenuation can be added to the sulfur meter. Nuclear density gauges are the only on-line process control instruments used in coal preparation plants. Worldwide development activities related to on-line analytical instruments are summarized, and development needs for product quality and process control instruments are discussed. 9 figures.

0140 Combustion

REFER ALSO TO CITATION(S) 43178, 43253, 43471, 44013, 44659

43257 (BMFT-FB-T—83-046) Planning, construction and operation of the 6 MWsub(th)-test facility Koenig Ludwig for firing bituminous coal in an atmospheric fluidized bed furnace. Krischke, H.; Geldmacher, H.; Kamp, K.H.; Golomb, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 140p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83751034.

Portions are illegible in microfiche products.

The first phase of the project "6 MW-Fluidized Bed Combustor Koenig Ludwig", sponsored by the Federal Ministry for Research and Technology was successfully finished by June, 30. 1982. Clean combustion of high ash and high sulphur coal could be proved with the AFBC, integrated in a standard boiler. Within 5030 operating hours, 4.376 t of bituminous coal ranking from high grade to low grade have been fired, generating 31.471 t saturated steam at 17 bar. During the 17-month test operation important knowledge concerning process and systems to burn coal in the fluidized bed was gained. The technical feasibility on an industrial scale was proved. Due to the positive results and experiences Ruhrkohle AG intends to continue the test operation together with the consortium Thyssen Engineering/Standardkesselgesellschaft on their own account.

43258 (CONF-8208141—, pp 128-155) **Rapidly expanding US market for industrial scale fluidized bed combustion.** Pell, M. (Conoco, Inc., Library, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The potential market for fluidized bed combustion systems is very large. There are, and will continue to be, incentives to replace gas and oil fired units with coal fueled units. A number of fluidized bed combustion systems are available. The marketplace will decide which fits best into each application and which is the most cost effective. The products of 10 manufacturers are described briefly.

43259 (CONF-8208141—, pp 169-191) **Commercialization of coal-water slurries - II.** Barsin, J.A. (Babcock and Wilcox Co., Barberton, OH). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

B and W considers Coal-Water Mixtures (CWMs) to be the most advantageous alternative to oil and gas fuels because the need for on-site coal handling and preparation equipment is excluded and because the use of oil is completely eliminated. If a low-ash coal is used in the mixture or if the coal is beneficiated, derating of the units will be minimized. Recent work has enabled a number of organizations to prepare pumpable mixtures (slurries) containing approximately 70% pulverized coal and 30% water. These slurries are stabilized to retard the settling of coal particles and to tailor the rheological properties so as to insure good flow through the careful variation of grinding processes and additives. Limited scale combustion tests have answered affirmatively the critical question of whether direct-fired undewatered slurry can achieve stable combustion without requiring support fuel. Once it had been determined that direct firing was feasible, a CWM commercialization program was initiated and is presently underway. Burner designers and boiler manufacturers are involved in laboratory-scale demonstrations that appear promising. Laboratory work already completed indicates that the slagging, fouling, erosion, stability and carbon utilization characteristics of the mixtures are predictable if the parent coal is known, and a retrofitable combustion system is being developed for this fuel. Conversion costs from oil to coal-water are significantly less than conversion costs from oil to direct pulverized coal for selected units, fuels and locations.

43260 (CONF-8208141—, pp 207-216) **Economic potential for cleaned coal water slurries: a utility perspective.** Vetter, J.R. (Florida Power and Light Co., Miami, FL). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The Florida Power and Light Company is the nation's fifth largest investor owned utility. It projects an annual growth rate of 4%. They have an installed generation capacity of 12,758 megawatts (18.3% nuclear and the rest is fueled by natural gas or oil. They are worried about the security of supply and price of oil and natural gas. New nuclear or coal-fired plants are unfeasible because of the high price of capital, nuclear plant license problems and the lack of coal storage and delivery systems. Conversion of the present plants to pulverized coal would be very expensive, with additional problems with coal storage and delivery infrastructure. They participated in a coal-fuel oil slurry demonstration test which was reasonably successful, but would involve some conversion cost and ash deposits, fouling and slagging in the boilers as well as a still considerable use of fuel oil. On the basis of these tests, however, and detailed engineering studies they are hopeful that conversion costs to burn coal-water slurries would be moderate and that slurries made with deep cleaned coal would not have serious ash or fouling problems. This is what they will try next. (LTN)

43261 (CTH-IE-T—82-104) Measurements of heat radiation in a fluidized bed combustor. Skoeldberg, H. (Chalmers Tekniska Hoegskola, Goeteborg (Sweden). Institutionen foer Energiteknik). Jun 1982. 46p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750767.

Portions are illegible in microfiche products.

The local heat flux through the furnace wall of a fluidized bed boiler was measured at three levels above the bed surface. The results were used to estimate the flue gas heat emission, specified as the gas emission and the soot emission. About 14 per cent of steam energy output is transferred as radiant heat in the furnace.

43262 (DOE/RG/10446—T3) Analysis of alternative fuel price trajectories. Appendix B. Results of analysis of MFBI data using natural logarithms. (Decision Analysis Corp., Annandale, VA (USA)). 15 Jun 1981. Contract AC01-80RG10446. 218p. NTIS, PC A10. Order Number DE81023084.

Paper copy only, copy does not permit microfiche production.

The order of appearance of information in this appendix of computer-generated data is the same as in Appendix A of this report. Unit firing rates and capacity factors are expressed in natural log equivalents. The computed means of the log of unit size and the log of capacity factors are the logs of their corresponding geometric means.

43263 (EPRI-AP—3006, pp 9.1-9.28) **Environmental effects of coal gasification.** Gehrs, C.W. (Oak Ridge National Lab., TN); Wobber, F.J. Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Environmental studies related to coal gasification have been concerned primarily with the ability of specific facilities to comply with existing or proposed regulations. Those studies designed to identify potential chronic effects and the transport of contaminants to man through the environment are becoming more important as we approach commercialization and deployment of facilities. This paper is organized by effluent type - atmospheric, solid and aqueous. It is designed to present a summary of available information on the status of knowledge with respect to sources of effluents, significance of effluents (as they relate to ecological effects), exposure pathways, and future research needs. Because coal gasification facilities will be sited in concert with existing technologies, a section on regional implications is also included.

43264 (SVF—129) **NO sub (x) formation from different coal types in a bench scale reactor under excess air and staged combustion conditions. Final report.** Chen, S.L.; Pershing, D.W.; Heap, M.P. (Stiftelsen foer Vaermeteknisk Forskning, Studsvik (Sweden)). Sep 1982. 192p. (KHM-TR—39). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750774.

Portions are illegible in microfiche products.

This report describes the results from the bench-scale fuel screening experiments. Twenty non-US coals (including lignite, subbituminous and bituminous) were tested in a 21-kw sub (t) refractory-lined tunnel furnace. NO emissions were measured as a function of coal composition and initial fuel/air contacting rate under excess air conditions. In addition, in-flame measurements were made to quantify the influence of stoichiometry and temperature on the fate of fuel nitrogen species under staged combustion conditions.

0150 Marketing And Economics

REFER ALSO TO CITATION(S) 43180, 44035

43265 (CONF-8208141—, pp 66-80) **Increased opportunities for coal in industrial markets.** Sudbury, J.D. (Conoco Inc., Library, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The national and world situation today present a tremendous opportunity for coal in the industrial market. Oil prices have abruptly risen to about four times the Btu price of coal. Technologies have evolved which permit the use of coal in systems which meet and often exceed environmental regulations with respect to emissions of SO_2, NO/sub x/, and paticulates. From 1930 till 1979, the price of oil relative to coal averaged a little over twice the Btu cost of coal. During the same period, natural gas prices never exceeded the price of coal. These trends were abruptly broken beginning in 1979 when oil prices relative to coal reached about 4:1 and gas prices for the first time exceeded coal prices. There is every reason to believe that natural gas prices will approach oil prices over the next few years and that the overall upward trends in price will continue. In 1930, 80 to 90% of all industrial boilers fired coal. During intervening years, oil and gas have become the predominant fuels for industrial boilers because of their relative low cost, environmental acceptance, lower capital costs for equipment and overall ease of operation. Fewer and fewer boilers capable of firing coal were installed during this period. It is a thesis of this paper that the present and anticipated price advantage of coal will trigger a major increase in industrial use of coal. In fact, some vendors report that essentially no new oil fired boilers are being built today. The historical, present and future trends for boilers with capability to fire coal are shown. New coal fired systems were almost non-existent through the late 70's. The evidence is now very strong that coal will have an increasing role in the next ten years, especially in the larger boilers.

43266 (NE-TFS—82-4) **Strategic analysis. A proposal for a method of investigation illustrated by the future competing situation of coal with biomass fuels.** Arremark, R.; Bogren, E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Oct 1982. 137p. (In Swedish). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750783.

Portions are illegible in microfiche products.

Market relations of fuels were studied by applying the System Dynamics (SD) method. The first phase of the SD method, the drawing up of causal loops was considered suitable. For the rest a new model was developed, which regards the energy system as a network with energy flows. The study included two different developments of future energy use, coal and biomass. The analysis indicates that physical and economic possibilities exist to change the direction at a later stage towards using biomass and peat as solid fuel. This work is characterised as a pre-study and the model can relatively easily be supplemented with various kinds of consequence - calculating routines.

0160 Health And Safety

REFER ALSO TO CITATION(S) 43227, 43229, 43241, 44812

0170 Legislation And Regulations

REFER ALSO TO CITATION(S) 43225

43267 (EPRI-AP—3006, pp 4.1-4.8) **Overview of pollution control requirements for the US gasification industry.** Cannon, J.A. (Environmental Protection Agency, Washington, DC). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

Two subjects are discussed in this paper. The first subject is how the US Environmental Protection Agency (EPA) is working to assure that the environmental concerns raised by the coal gasification industry are addressed. The second subject is a discussion of the need for cooperation between EPA and the synfuels industry. Three major EPA activities are discussed. These are: (1) permitting; (2) application of EPA's toxics program to synfuels; and (3) monitoring. EPA is working hard toward the goal of assuring that the synfuels industry develops in an environmentally acceptable manner with cost-effective controls.

43268 (EPRI-AP—3006, pp 27.1-27.30) **Environmental regulation of the synfuel industry.** DeCicco, S.G. (Oak Ridge National Lab., TN). Apr 1983. NTIS, PC A99/MF A01. (CONF-820791—).

From Workshop on environmental control technology for coal gasification; Palo Alto, CA, USA (28 Jul 1982).

The Environmental Protection Agency's (EPA) legislative mandate requires the agency to develop standards based on sound scientific data. The EPA believes that most synfuel processes have not matured to the point of producing the data base needed for the agency to develop prudent standards. Therefore, the EPA has adopted the near-term policy of regulating the synfuel plants on a case-by-case basis, using the permit system. The Federal and state permit writers will have authority to determine what constitutes acceptable environmental control technology, final pollutant discharge levels, and monitoring. They will draw on several tools at their disposal - most importantly, the EPA's technical manuals on synfuel pollution control. In conjunction with this, technical review and support will be supplied by both the EPA's Office of Research and Development and the program offices. The permit writers will also draw on the standards and environmental control technology experience of related industries. For monitoring guidance, the permit writers will have the EPA's monitoring manuals. The agency has specifically emphasized their desire to have an open information exchange with industry during the permitting process to help them determine what level of control can realistically be expected of a given process. 8 tables.

02 PETROLEUM

0202 Geology And Exploration

REFER ALSO TO CITATION(S) 44324

43269 (LBL—15227) **GMINC: a mesh generator for flow simulations in fractured reservoirs.** Pruess, K. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 68p. NTIS, PC A04/MF A01. Order Number DE83014911.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

GMINC is a pre-processor computer program for generating geometrical meshes to be used in modeling fluid and heat flow in fractured porous media. It is based on the method of multiple interacting continua (MINC) as developed by Pruess and Narasimhan. The meshes generated by GMINC are in integral finite difference form, and are compatible with the simulators SHAFT79 and

MULKOM. Applications with other integral finite difference simulators are possible, and require slight modifications in input/output formats. This report describes methodology and application of GMINC, including preparation of input decks and sample problems. A rather comprehensive overview of the MINC-method is also provided to make the presentation self-contained as a guide for modeling of flow in naturally fractured media.

0203 Drilling And Production

REFER ALSO TO CITATION(S) 43291

43270 (DOE/BC/10116—20) Flow in porous media, phase behavior and ultralow interfacial tensions: mechanisms of enhanced petroleum recovery. Final report. Macoeko, C.W.; Miller, W.G.; Prager, S.; Davis, H.T.; Scriven, L.E. (Minnesota Univ., Minneapolis (USA). Dept. of Chemical Engineering and Materials Science). Jul 1983. Contract AC19-79BC10116. 265p. NTIS, PC A12/MF A01. Order Number DE83015636.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

From the long-abuilding Minnesota team of investigators and their highly productive, ongoing program of coordinated basic research into mechanisms of enhanced petroleum recovery the 1981 outputs were again ideas, instruments, techniques, data, understanding, and skilled people: 34 scientific and engineering papers in leading, refereed journals, 3 pioneering PH.D. theses; numerous presentations to scientific and technical meetings, industrial governmental and university laboratories; a vigorous program of exchange of researchers; and 3 outstanding Ph.D.'s transferred to permanent research positions in the petroleum industry. This report summarizes the 1981 papers and theses and features nine major accomplishments of the program during that year. Abstracts of all 37 publications in the permanent literature are appended. Further details of information transfer and personnel exchange with industrial, governmental and university laboratories are available in 1981 Quarterly Reports available from the Department of Energy and are not reproduced here. The Minnesota program continued in 1982 with the support of the Department of Energy, University of Minnesota departmental funds, and important supplemental grants-in-aid from eight companies in the petroleum industry.

43271 (DOE/MC/08383—45-Vol.1) Little Knife Field CO_2 minitest, Billings County, North Dakota. Final report. Volume 1. Technical report. Upton, J.E. (Gulf Oil Exploration and Production Co., Oklahoma City, OK (USA)). Jul 1983. Contract AC19-79MC08383. 278p. NTIS, PC A13/MF A01. Order Number DE83015381.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A carbon dioxide minitest was conducted in the Mission Canyon Formation (lower Mississippian) at Little Knife Field, North Dakota. The Mission Canyon is a dolomitized carbonate reservoir which is undergoing primary depletion. Four wells were drilled in an inverted four-spot configuration, covering five acres. The central well served as the injection well and was surrounded by three non-producing observation wells. Oriented cores were cut in each well for detailed reservoir characterization and laboratory testing. In addition, a well test program was conducted which involved two pulse tests and injectivity tests on the individual wells. Results from these tests were used as part of the input data for two reservoir simulation models. Various parameters in the computer models were varied to determine the most efficient injection plan for the specific reservoir characteristics. The pattern sweep efficiency for carbon dioxide approached 52 percent in the minitest area. Displacement efficiency, as indicated by simulation study, was 50 percent of the oil-in-place at the start of the project, compared with an efficiency of 37 percent for waterflood. Thirty-one hundred cubic feet of CO_2 were required per incremental barrel of displaced oil. The absence of producing wells and the fact that only one zone within the Mission Canyon Formation was flooded, favorably influenced these figures. The Little Knife CO_2 minitest confirmed, by field testing, the results of laboratory CO_2 miscible displacement tests. The minitest indicated that the CO_2 miscible displacement process has technical potential for commercialization in a dolomitized carbonate reservoir that has not been extensively waterflooded and has an indicated high remaining oil saturation. 159 figures, 46 tables.

43272 (DOE/MC/08383—45-Vol.2) Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report. Upton, J.E. (Gulf Oil Exploration and Production Co., Oklahoma City, OK (USA)). Jul 1983. Contract AC19-79MC08383. 416p. NTIS, PC A18/MF A01. Order Number DE83015380.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A study of the water injection phase of the Little Knife CO_2 minitest has been completed using a three-dimensional, three-phase black oil simulator. The study was designed to investigate the water injection requirements for repressurization and the effects of the injection on the reservoir. An accurate reservoir characterization was necessary to accomplish this goal. It is believed that by including a detailed description of reservoir properties and production history, a good reservoir characterization was obtained. Using the resultant reservoir model, several prediction cases were run to simulate the effects of various injection plans on the minitest area. These cases included two injection start up dates and two different future production performance schedules. The following conclusions are drawn, based upon the results of this study: (1) the pressure in the minitest area will be raised above the calculated minimum CO_2 miscibility pressure of 3400 psig, if water injection is begun on either October 1, 1980 or September 1, 1980; (2) a water injection rate of 1150 STB/D, for fifteen (15) days, will adequately repressure the pilot area if the above dates are observed; (3) the current rate of reservoir fluid withdrawal will not adversely affect the pilot area if the aforementioned injection plan is utilized; (4) water injection in the pilot area will not strongly affect the average reservoir pressure in the D-zone of the Little Knife field. 28 figures, 11 tables.

43273 (DOE/MC/10865—13) CO_2 formation damage study. Final report. Patton, J.T. (New Mexico State Univ., Las Cruces (USA)). Jul 1983. Contract AC21-79MC10865. 238p. NTIS, PC A11/MF A01. Order Number DE83015360.

The literature did provide insight into four possible damage mechanisms, namely: (1) precipitation of reservoir mineral in the vicinity around the producing well as carbon dioxide escapes from the water phase due to pressure draw down; (2) plugging of reservoir interstices by insoluble organic solids precipitated as the carbon dioxide dissolves in crude oil; (3) formation of an immobile gas phase, predominately CO_2, which would drastically lower the effective permeability to oil and, especially water; and (4) dissolution of cementation, especially carbonates or feldspars, that could allow fines to migrate in the reservoir and plug tiny flow passages. Each of these mechanisms was investigated in depth during the laboratory experiments. Occasional reports from industry suggested that the use of carbon dioxide to enhance the recovery of tertiary oil might be causing formation damage. This project was undertaken to define the mechanisms responsible for such occurrences. The objectives were threefold: (1) provide a comprehensive literature survey to elicit all that is currently known or suspected, relative to formation damage that might occur during the injection of carbon dioxide into an oil reservoir; (2) under simulated reservoir conditions, demonstrate in the laboratory each of the damage mechanisms and quantify the degree to which each mechanism could cause damage; and (3) for those damage mechanisms identified to be significant, develop a feasible remedy, easily applied in actual field operations. The third mechanism, related to the presence of an immobile gas phase, is a real problem but not unique to the injection of carbon dioxide. In the case of carbon dioxide, the damage should be self-correcting, as the solubility of carbon dioxide in water will eventually allow the water to dissolve away the gas and, hence, the blocking effect.

43274 (IFE/KR/E—9) BETA3A user' s manual. Fladmark, G.E.; Aurstad, M. (Institutt for Energiteknikk, Kjeller (Norway)). May 1982. 66p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750790.

The computer code BETA3A is a three-dimensional three-phase black oil modelled reservoir simulation program, and this report is the user' s manual for the program. The complete input is described and informations about the output is given. Restart possibilities exist in the program. They are discussed and necessary instructions given. Error checking is done by the program both during the input processing and the actual simulations. Different error messages may be given. They are defined in the report. The program makes use of nine tapes or logical units. These are defined together with the necessary record lengths.

43276 **(IFE/KR/E—10) BETAPLOT user' s manual.** Martinussen, I. (Institutt for Energiteknikk, Kjeller (Norway)). May 1982. 55p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750788.

Portions are illegible in microfiche products.

The computer code BETA3A is a three-dimensional three-phase black oil modelled reservoir simulation program which writes a restart file containing all the results from the simulation. The file serves two purposes: (1) it is a restart file and may be used as an input file for a continued simulation; and (2) it is used as a data file for generating output tables, plots, summaries etc. from the simulation. For the latter use the program BETAPLOT is written. This report is the user' s manual for BETAPLOT. 2 drawings, 3 tables.

43276 **(NMERDI—2-70-3302) Displacement of oil by carbon dioxide. Annual report, October 1981-September 1982.** Orr, F.M. Jr.; Taber, J.J. (New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center). Jun 1983. 119p. New Mexico Energy Research Development Inst., Information Center, Univ. of New Mexico, 117 Richmond Dr., N.E., Albuquerque, NM 87106.

Results of a comprehensive research effort to investigate and quantify factors which affect the performance of CO_2 flood processes in reservoir rocks are presented. An apparatus is described in which displacement of oil from pore networks etched in glass by CO_2 at high pressure can be observed visually. Results of a series of secondary and tertiary, first contact and multiple contact miscible displacements are reported. Results of one- and two-phase displacements which validate the experimental techniques are reported. Results of a series of PVT experiments to study the effects of changing both the amount of dissolved gas in a crude oil and the system temperature are given. Those results suggest strongly that the extrapolated vapor pressure of CO_2 is a good estimate of the minimum miscibility pressure if the temperature is below about 140°F. Modifications and improvements to the design of the continuous multiple contact apparatus are described, as are preliminary tests of the use of an oscillating quartz crystal to measure viscosities. Results of a series of phase composition measurements to study effects of oil composition on component partitioning in CO_2-crude oil systems are reported. The theory of the effect of CO_2-crude oil phase behavior on displacements in an ideal porous medium is tested by predicting the performance of slim tube displacements from independently measured phase behavior and fluid property data obtained with the continuous multiple contact experiment. The quantitative agreement between prediction and experiment is good enough to suggest that the essentials of CO_2-crude oil phase behavior can be modeled with a small number of pseudo-components. Finally, modifications to the one-dimensional process simulator to model effects of oil isolated by water are discussed and results of sample calculations are reported. 57 figures, 6 tables.

43277 **(SAND—83-7100) Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982.** Krueger, D.A. (Colorado State Univ., Fort Collins (USA). Dept. of Physics). Jun 1983. Contract AC04-76DP00789. 44p. NTIS, PC A03/MF A01. Order Number DE83015632.

Fingering and gravity override of a steam-plus-nitrogen mixture displacing water in a porous medium have been studied experimentally and theoretically. The experiments have been carried out in a transplant, bead-packed cell (39 cm x 19 cm x .64 cm) at about atmospheric pressure. Results of Stegemeier, Laumbach, and Volek could be used to scale to actual reservoir conditions. We discuss the conditions necessary to avoid counter flow of the gas and liquid phases. A theory of gravity override of steam displacing water has been developed. It has been compared with our experimental results and gives good agreement with the angle of front layover as a function of time. We have developed a computerized front tracking system to allow us to follow the time development of each Fourier component of a perturbation. The increased understanding of condensation-front stability and override will allow optimization of steam/nitrogen injection in enhanced-oil-recovery field projects. 9 figures.

43278 **(SI-R—800303-WD-1) Well control in case of offshore blowout. Diversion.** Westergaard, R.H. (Sentralinstitutt for Industriell Forskning, Oslo (Norway)). Mar 1981. 12p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750793.

By diverting a blowout as soon as possible, the consequences of a platform blowout can be drastically reduced and regaining control facilitated. Various aspects of establishing a Blowout Diverting Preparedness are outlined and discussed. Permanent diverter arrangement for operations when using a Blowout Preventer seems to have some merit. To divert a 3000 to 10000 tons/day blowout is problematic. 1 drawing.

43279 **(SI-R—800303-WD-2) Well control in case of offshore blowout. Oil collection on platforms.** Westergaard, R.H. (Sentralinstitutt for Industriell Forskning, Oslo (Norway)). Mar 1981. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750794.

It is concluded that oil coming from a blowout through a diverter in principle can be recovered, but this is complicated and dangerous and not worth consideration because once successfully diverted, the blowout will most likely not last more than hours or a few days. The report concludes that use of special oil catchers and of knockdown nozzles in the rig holds too little promise to be worth working with. Spill collection trays under the drill floor and/or the cellar deck are considered interesting, and further work is recommended, particulary for Condeep platforms.

43280 **(SI-R—800303-WD-3) Well control in case of offshore blowout. Mechanized drill pipe handling, stabbing, stripping/snubbing, drill string telemetry and mud monitoring, better BOP.** Westergaard, R.H. (Sentralinstitutt for Industriell Forskning, Oslo (Norway)). Mar 1981. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750795.

It is suggested that rigs with mechanized drill pipe handling will have fewer injuries and that this reduces the blowout risk. Capability to stab on the kelly, even if there is a drill pipe blowout, reduces the blowout risk. It is suggested that such rigs can be given a snubbing capability which further reduces the blowout risk. It is recommended to make a strong effort aimed at modernizing the drilling methods. In this connection drill stem telemetry and mud monitoring and similar should be viewed together.

43281 **(SI-R—800303-WD-4) Well control in case of offshore blowout. Well killing-final control-after shut-in in relation to the various control methods.** Westergaard, R.H. (Sentralinstitutt for Industriell Forskning, Oslo (Norway)). Mar 1981. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750796.

After a blowout has been stopped, the well must be secured and thereafter repaired or plugged. Some of the proposed devices for blowout control make this difficult and risky. This causes such methods to be less attractive. But as a last resort they may still be useful. The various devices for blowout stopping are assessed from this point of view.

43282 **(SI-R—800303-WD-5) Well control in case of offshore blowout. Capping on the sea floor, blowout risk of subsea oil production.** Westergaard, R.H. (Sentralinstitutt for Industriell Forskning, Oslo (Norway)). Mar 1981. 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750797.

Portions are illegible in microfiche products.

Single wells with wet production tree are easier to cap than other wells - and also easier for underwater collection, and less likely to be hit by falling objects. Blowouts from completed subsea wells are likely to produce very large oil spills. It is recommended to strengthen the underwater work capability, but not to build special underwater capping equipment at present. 6 drawings.

0204 Processing

REFER ALSO TO CITATION(S) 43174, 43175, 43177

43283 (DOE/FE/60173—T1) Energy plant process operations Curriculum-Development Project. Final technical report. Guenthner, R. (Bismarck Junior Coll., ND (USA)). Spr 1983. Contract FG02-82FE60173. 74p. NTIS, PC A04/MF A01. Order Number DE83014595.

The Process Plant Technology training program is designed to meet current technical entry level operator manpower needs of oil refineries, sour gas and gas processing plants and emerging synfuel plants.

43284 (IFP—30-368) Contribution to the study of reforming catalyst aging by coking. Espinat, Didier. (Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison). Sep 1982. 22p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750925.

Portions are illegible in microfiche products.

This study concerns the coking of reforming catalysts. The present tendency is to operate the unit in increasingly severe conditions, distinguished by the use of low hydrogen pressures and high space velocities. This development meets concerns of energy conservation and installation profitability, but entails faster ageing of the catalysts. This work initially attemps to measure the coking effect on a number of reactions. The location and structure of the coke are then examined. Coke appears as a heterogeneous deposit on the catalyst surface, and can cause 'clogging' of certain pores. Some areas display little or no coking, while others are completely embedded in the coke. On the microscropic scale, covering a few tens of micrometers, the coke deposit also appears to be unevenly distributed. Part of the coke deposit displays a high degree of pregraphitic organization. The simultaneous growth of polyaromatic compounds, strongly adsorbed on the catalyst surface, inhibits the catalyst's activity. The composition of the coke formed was correlated with certain parameters associated with the type of catalyst, such as the metal function and the alumina support, and also with the operating conditions of the catalyst such as the H_2/HC ratio. While the coke structure is identical in most bimetal catalysts, platinum/iridium and platinum/rhenium base samples are a special case. They appear to produce a smaller quantity of coke precursors. Simultaneously, the increase in the H_2/HC ratio has an effect on the structure identical to that produced by the bimetal function Pt-Ir. The change in support fails to exhibit any significant change in the structure of the coke deposit

0205 Products And By-products

REFER ALSO TO CITATION(S) 44013

0206 Health And Safety

REFER ALSO TO CITATION(S) 44684

0207 Marketing And Economics

REFER ALSO TO CITATION(S) 44034

43285 (DOE/EIA—0380(83/06)) Petroleum marketing monthly. (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). Jun 1983. 83p. NTIS, PC A05/MF A01. Order Number DE83015425.

Portions are illegible in microfiche products.

This report presents information and statistical data about a variety of petroleum products, including motor gasoline, distillates, residuals, jet fuel, kerosene, and propane. It contains summaries of petroleum product statistics for the United States, Petroleum Administration for Defense (PAD) Districts, and individual States. Three types of petroleum product statistics are included: sales prices of petroleum products; sales volumes of petroleum products; and percentages of petroleum product sales. The publication highlights salient statistics in a summary, and covers each of the three subjects in detail in separate sections.

0209 Environmental Aspects

REFER ALSO TO CITATION(S) 43278, 43279, 43280, 43281, 43282, 44682

43286 (FWS/OBS—82/03) Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts. Woolfenden, G.E. (University of South Florida, Tampa (USA). Dept. of Biology). Feb 1983. 77p. Dept. of the Interior, Fish and Wildlife Services, Div. of Biological Services, Washington, DC 20240.

The eight southwestern Florida counties include populations of 68 vertebrates considered in this report as rare, threatened, or endangered. The terrestrial and near-shore habitats of the study area and the habitat preferences of each of the 68 vertebrates are described. Each vertebrate is listed in the habitats it occupies, and information about reproduction, feeding, and where available, population estimates, is given under the habitat considered most important for each species. The distributions of the rare, threatened and endangered vertebrates by county and habitat demonstrate the relative importance of the southernmost counties (Monroe and Collier) and wetland and coastal habitats (strand, mangrove/marsh, estuaries). Activities contributing to the decline of these 68 vertebrates are assessed and habitat loss is overwhelmingly more important for all. Potential impacts of OCS development are assessed by estimating the effects OCS activities might have on various habitats. Direct impact of OCS development is estimated to be small. Oil spills are considered the most dangerous result of development and the habitats continguous with marine waters (strand, mangrove/marsh, estuaries) are the most susceptible to damage. These are also the habitats identified as harboring the largest, number of rare and endangered vertebrates in southwest Florida.

43287 (NP—3750791) Full scale tests with oil recovery systems offshore. Norway, June 1980. Langfeldt, J.N.; Wold, M. (Norges Teknisk-Naturvitenskapelige Forskningsraad, Oslo. Program for Oljevernberedskap). Jun 1981. 59p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750791.

Portions are illegible in microfiche products.

The aim of the tests was to establish whether or not the newly developed Norwegian skimmers could increase the recovery rate in an oil spill situation with a large oil spill. In addition the tests would give data and experience to users and manufacturers of oil spill equipment. The tests were planned to be carried out with a wave height between 2 and 3 m, and with a wind velocity of 10-15 m/s. These conditions were not present in the trial period in June 1980. Other significant conditions however, existed, and the wind and wave conditions at the last series of tests were severe enough to give a fairly good impression of the systems in waves. On the basis of the results obtained it is possible to make changes in all the systems in order to increase their performance. results also showed the necessity of using oil in the testing of this equipment. This does not exclude the use of bark or similar substances for testing oil recovery equipment, since the oil tests confirmed that adjustments made, based on the bark test, had improved the equipment. The separation of emulsion from free water proved to be more rapid than expected after some research work was done. This rapid separation makes it possible to design equipment with a low separation efficiency as long as the amount of emulsion recovered is high. 20 drawings, 6 tables and 19 photos.

43288 **(OCS—73-Vol.1) Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. I. Final environmental-impact statement OCS Sale No. 73.** (Minerals Management Service, Los Angeles, CA (USA). Pacific OCS Region). Jun 1983. 573p. Department of the Interior, Minerals Management Service, 1340 West Sixth Street, Los Angeles, CA 90017.

This environmental impact statement is a description of the environmental aspects and impacts of oil and gas activities resulting from the oil and gas lease sale offshore Central California.

43289 **(OCS—73-Vol.2) Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. II. Final environmental-impact statement OCS Sale No. 73.** (Minerals Management Service, Los Angeles, CA (USA). Pacific OCS Region). Jun 1983. 545p. Department of the Interior, Minerals Management Service, 1340 West Sixth Street, Los Angeles, CA 90017.

This environmental impact statement is a description of the environmental aspects and impacts of oil and gas activities resulting from the oil and gas lease sale offshore Central California.

0220 Transport, Pipelines, And Handling

43290 **(IFE/KR/E—6) Severe slugging in two-phase flow systems.** Bendiksen, K.; Malnes, D.; Nuland, S. (Institutt for Energiteknikk, Kjeller (Norway)). Apr 1982. 38p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750787.

Portions are illegible in microfiche products.

A review of performed experimental and theoretical work concerning terrain-induced slug flow is presented. The dynamic two-phase flow model, OLGA, is described in some details. The mass and momentum conservation equations for each phase, on finite difference form, are solved numerically, using an implicit integration in time. Slip effects due to the different local velocity profiles or mass distributions in the two phases, are incorporated. The energy equations have been omitted, and temperature-profiles are specified through the input. There are at present three material property packages available: black oil, kerosene-nitrogen and water-nitrogen. Comparison of results from OLGA calculations with experimental data are presented, as well as predictions for a planned experiment to be performed in a high pressure, large diameter two-phase loop completed in Trondheim, Norway. 21 drawings, 3 tables.

0230 Properties

43291 **(AEEW-R—1636) Winfrith PVT Package.** Mott, R.E. (UKAEA Atomic Energy Establishment, Winfrith). Apr 1983. 60p. Winfrith Secretariat, Atomic Energy Establishment, Winfrith Dorchester, Dorset, England.

The Winfrith pressure-volume temperature (PVT) Package has been developed to carry out a number of tasks associated with the modelling of the PVT behaviour of petroleum-reservoir fluids, as follows: calculation of the PVT properties of reservoir fluids using a thermodynamic equation of state; adjustment of selected equation of state parameters to match results from laboratory PVT experiments, by use of non-linear regression analysis; condensation of a multi-component equation of state model to a few-component model suitable for use in a compositional simulator. A multi-component model may also be condensed into a two-component oil-gas system for a miscible flood simulator; calculation of black-oil type PVT tables for calculations on gas condensate or volatile oil reservoirs; generation of interface files containing the PVT data needed for input to the PORES or COMP II reservoir simulators; and calculation of the variation of fluid composition with depth within a reservoir, by relating chemical and gravitational potentials. This report describes the equation of state model employed in the PVT Package and the methods used for calculating fluid properties. Applications of the PVT Package are discussed and results from a number of typical calculations are presented. 11 figures.

0250 Combustion

REFER ALSO TO CITATION(S) 43178, 43253, 43259, 43260, 43262

03 NATURAL GAS

0301 Reserves

REFER ALSO TO CITATION(S) 43293

43292 **(DOE/EIA—0167(82)P) Domestic natural gas reserves and production dedicated to interstate pipeline companies, 1982.** Arnold, J.R. (USDOE Energy Information Administration, Washington, DC). Jun 1983. 7p. NTIS, PC A02/MF A01. Order Number DE83014999.

A preliminary compilation of information reported by interstate natural gas pipeline companies to the Energy Information Administration (EIA) on FERC Form 15, Interstate Pipeline's Annual Report of Gas Supply, indicates that domestic natural gas reserves dedicated to the interstate market at the end of 1982 were 98.7 trillion cubic feet (Tcf), an increase of 0.4 percent from the 98.3 Tcf at the end of 1981. EIA's preliminary compilation indicates that the volume of natural gas produced from dedicated reserves in 1982 totaled 10.9 Tcf, a decrease of 8.9 percent from the 12.0 Tcf produced during 1981.

0302 Geology And Exploration

REFER ALSO TO CITATION(S) 44324

0303 Drilling, Production, And Processing

REFER ALSO TO CITATION(S) 43249, 43283

0306 Marketing And Economics

43293 **(CONF-8211101—1) Economics of extracting blanket tight-sands gas with current and improved technology.** Hanson, D.A.; South, D.W. (Argonne National Lab., IL (USA)). May 1983. Contract W-31-109-ENG-38. 29p. NTIS, PC A03/MF A01. Order Number DE83014330.

From International Asssociation of Energy Economists meeting; Denver, CO, USA (17 Nov 1982).

Portions are illegible in microfiche products.

The purpose of this paper is to examine the recoverable quantities and extraction costs of western tight sands gas most suitable for near- and mid-term development. The results of this assessment take the form of resource supply curves, which show cumulative resource availability versus expected extraction cost. The extraction cost estimates for the resource supply curves are based upon current technology, risks and well spacing regulations. Changes in these parameters will shift the resource supply curves. In this paper, the effects of fracturing technology improvements, risk reduction and less stringent well spacing regulations are investigated. In addition, some historical evidence is analyzed yielding an estimate of average technology performance in the mid- to late-seventies. Based on this estimate of average technology performance, the expected availability of tight sands gas as a function of extraction cost is calculated and presented. Also, shifts in this resource supply curve are presented due to expected technology improvement. Some brief descriptions of geologic and technical problems are included to give the reader an idea of the opportunities for improved technology performance. As the extraction of tight sands gas improves through R and D efforts and field experience two simultaneous effects may result: (1) average technology performance may improve and (2) risks may be reduced. Both effects are exhibited by advances in the understanding and reliability of the massive hydraulic fracturing technology. Based on the authors' calculations, an average fracture length change from 1000 to 1200 ft, altogether with a reduction in the required rate of return (risk premium) from 15% real to 10%, yields a 35% reduction in extraction costs. With

these improvements, additional resources would also become economic. 6 figures, 2 tables.

0308 Environmental Effects

REFER ALSO TO CITATION(S) 43288, 43289, 44693

43294 (NILU-OR—1/81) Prediction of hazard area resulting from a gas release. Eidsvik, K.J. (Norsk Inst. for Luftforskning, Kjeller). Jan 1981. 28p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750784.

Portions are illegible in microfiche products.

A synthesis of hazard area prediction following the release of a hazardous gas cloud is developed. At a fixed risk level the predicted hazard area is estimated to depend much upon prediction errors for actual atmospheric transport and flow parameters. 4 drawings.

0309 Artificial Stimulation

REFER ALSO TO CITATION(S) 43293

43295 (DOE/MC/19239—1422) Conceptual models for gas hydrates. Phase I. Technical Directive 6. Final report. Kuuskraa, V.; Hammershaimb, E.; Sawyer, W. (Lewin and Associates, Inc., Washington, DC (USA)). 10 Jun 1983. Contract AC21-82MC19239. 59p. NTIS, PC A04/MF A01. Order Number DE83015129.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Three conceptual models for the recovery of methane hydrates are discussed in this report that address different recovery methods for producing gas from hydrates. The three models are: (1) single-well cyclic thermal injection; (2) multi-well continuous thermal injection; and (3) reservoir depressurization. In the first model, a reservoir is stimulated (either radially, horizontally or vertically), steam is injected, and water/gas are produced cyclically. In the second model, 2 or more wells are interconnected by an induced fracture and the injection of steam and production of gas and water are continuous. In the third model, an induced fracture with a large surface area is propagated into the reservoir, the pressure in the fracture is maintained at a low value, and gas is produced through the gas-ice zone as the hydrate dissociates. The three conceptual hydrate recovery models represent original work as well as building on prior work by others. Five previously published models are reviewed for their strong and weak points and applicability to this modeling effort is summarized in Attachment A. 16 figures, 1 table.

43296 (SAND—83-0964) High-energy gas-fracturing development. Annual report, April 1982-March 1983. Cuderman, J.F. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 118p. (GRI—81-0183). NTIS, PC A06/MF A01. Order Number DE83015724.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A propellant-based fracture technology has been developed that permits control of pressure loading in a borehole in order to produce multiple fractures radiating from the wellbore. Between four and eight radial fractures are formed when a mixture of solid propellants is tailored to burn at a rate that produces a pressure pulse faster than the pulse needed to produce a single hydraulic fracture yet slower than the pulse that crushes the wellbore. The proper propellant mixture is determined using semiempirical models that predict fracture length, fracture orientation, radial stress, and radial acceleration. Fracture kinetics are modeled by a finite-element model designed to predict the type of fracturing obtained, fracture length, fracture orientation, stress, and displacement. The High Energy Gas Fracture (HEGF) technology will be applied to Devonian shale, where commercially economic production is dependent upon the formation of conduits that enable the natural gas to migrate from the shale's natural fractures into borehole. 41 figures, 4 tables.

0320 Transport, Pipelines, And Handling

REFER ALSO TO CITATION(S) 43290, 44013

43297 (CONF-830664—1) Acoustic technique for pinpointing leaks in low-pressure gas mains. Huebler, J.E.; Altpeter, L.L. Jr. (Institute of Gas Technology, Chicago, IL (USA)). 1983. 12p. Institute of Gas Technology, 3424 South State Street, IIT Center, Chicago, IL 60618.

From International gas research conference; London, UK (13 Jun 1983).

A passive sonic leak-pinpointing technique is being developed for low-pressure (1.7 to 3.4 kPa) gas-distribution mains. Experimental laboratory results demonstrate that low-pressure leaks can be detected and accurately pinpointed to -+15 cm by moving a microphone inside of the distribution main. Our results also indicate that it is feasible to determine the type or leak and the flow rate of gas through the leak. The signal processing for typing and sizing has not been developed as yet. Such processing may prove to be complex. Currently, the major need and thus the major emphasis is for a leak pinpointer. Sizing and typing leaks would be bonus features if available. Combining experimental results with theories for the noise produced by gas jetting through an orifice and the propagation of sound through opening in walls yields a coherent picture of leak sound inside a main. 9 figures.

43298 (EPRI-EL—3106-Vol.3) Power-line-induced AC potential on natural-gas-pipelines for complex rights-of-way configurations. Volume 3. Computer program user's guide. Final report. Frazier, M. (Science Applications, Inc., Schaumburg, IL (USA)). May 1983. 50p. NTIS, PC A03/MF A01. Order Number DE83902594.

Portions are illegible in microfiche products.

The joint use of common corridors for overhead electric-power-transmission lines and buried natural-gas-transmission pipelines results in the coupling of electromagnetic energy onto the natural-gas-transmission pipelines. This project has resulted in the development of the methodology and techniques for analyzing such complex common corridor coupling problems. Two complementary methods have been developed for solving coupling problems on common corridors: a handbook that provides simplified procedures and graphical aids that can be used to analyze many less complex common corridor concerns, and a computer program that provides the means for analyzing a wide range of more complex configurations. This volume contains instructions for using the computer program.

43299 (KFK-PDV—215) Computer program GANBEO. Lappus, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Prozeßlenkung mit Datenverarbeitungsanlage). Jul 1982. 45p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750197.

Both, the operation of high pressure gas transmission systems and distribution networks by means of today's available efficient simulation and load prediction programs and the complete supervision of these systems require precise knowledge of the actual state in the total pipeline system. For economical reasons it is desriable not to use a full instrumentation set, but to estimate the actual state using only a small number of measurements at discrete locations. This state reconstruction task is solved online and in realtime by the program GANBEO. Its main features and the results of a succesful test using real field test data are reported. The program and its full documentation (PDV-development reports KFK-PDV-E 153, 154, 155) are available.

43300 (KFK-PDV—225) Supervision and control of gas transportation and distribution systems. Lappus, G.; Schmidt, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Prozeßlenkung mit Datenverarbeitungsanlage). Feb 1983. 31p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751077.

With 2 figs., 37 refs.

For several years advanced methods of supervision and control of large gas distribution networks were investigated and developed. This report surveys the main results of this work, supported by government and industry: - a modern supervision and control scheme, - development of the program GANESI for the simulation of the transient flow process, - development of the gas network observer program GANBEO (on-line state estimation), - industrial application of the developed methods and programs.

0330 Properties

43301 **(NP-tr—3901778) Correction of the AGA NX-19 mod data-processing system for real gas factors of type H natural gas.** Jaeschke, M.; Harbrink, B. Translated from *GWF, das Gas- und Wasserfach: Gas/Erdgas ;* **123**: No. 1, 20-27(1982). 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83901778.

Portions are illegible in microfiche products.

The BR-KORR.3H calculating system describes the real gas behaviour of type H natural gases at pressures up to 90 bar and temperatures between -10°C and 30°C. The calculation system is in fact a correction formula for the existing AGA NX-19 mod calculation system. The correction is applied as a function of the gross calorific value, the density ratio and the mol contents in carbon dioxide and in addition pressure and temperature. The mathematical method reproduces the measuring data under consideration for real gas factors with a mean square error of 0.12%. 7 figures, 5 tables.

0340 Combustion

REFER ALSO TO CITATION(S) 43262

04 OIL SHALES AND TAR SANDS

0402 Site Geology And Hydrology

REFER ALSO TO CITATION(S) 43306

0403 Drilling, Fracturing, And Mining

REFER ALSO TO CITATION(S) 43296

43302 **(LA-UR—83-399) Simulation of rock blasting with the SHALE code.** Adams, T.F.; Demuth, R.B.; Margolin, L.G.; Nichols, B.D. (Los Alamos National Lab., NM (USA)). 1983. 14p. (CONF-830806—1). NTIS, PC A02/MF A01. Order Number DE83007555.

From 1. international symposium on rock fragmentation by blasting; Lulea, Sweden (23 Aug 1983).

The SHALE code and its special features for simulating rock blasting are described. SHALE first simulates the detonation of the explosive and then follows the effect of the resulting shocks and stress waves on the surrounding rock. A general description is given for SHALE as a finite-difference stress-wave-propagation code, followed by a brief discussion of numerical methods, and a section on the treatment of the explosive. The constitutive model in SHALE is the BCM (Bedded Crack Model), which describes the response of the rock, including fracture. The use of SHALE is illustrated in a discussion of the basic phenomenology of crater blasting, as seen in simulations of field experiments in oil shale. Predicted peak surface velocities are found to agree with field measurements. Comparisons between predicted fracture and observed craters give insight into the relative roles played by shock waves and the high-pressure-explosive product gases. The two-dimensional version of SHALE is being documented and will be available for use by other investigators. A three-dimensional version is planned.

0404 Oil Production, Recovery, And Refining

REFER ALSO TO CITATION(S) 43174, 43175, 43177, 43306, 44651

43303 **(CONF-830439—11) Development of a local void-defect model which accounts for yield losses caused by flow nonuniformities.** Lyczkowski, R.W. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 17p. NTIS, PC A02/MF A01. Order Number DE83014743.

From 3. multi-phase flow and heat transfer symposium; Miami, FL, USA (18 Apr 1983).

Portions are illegible in microfiche products.

The purpose of this paper is to quantify the specifics of the local void-defect-induced flow maldistribution model discussed by Galloway, (T.R. Galloway, A Proposed Fluid Mechanics Program For Oil Shale, UOPKK. 78-30, July 5, 1978). This model explains many of the phenomena observed during retorting of wide size-range oil shale particles. The difference between this model and that proposed earlier is that the local void-defect model presents a low risk approach to the flow nonuniformity problem, since it is constructed from validated tools already in existence. Both macro and local flow effects are accounted for. Most importantly, the model pinpoints the key mechanisms involved in oil yield losses caused by flow irregularities. Additionally, the way is defined for a pseudo one-dimensional model which builds upon the one-dimensional oil shale retort model. We have been searching for the key or trigger mechanism which results in oil yield loss. This model appears to qualify high on the list of available candidates. 6 figures, 2 tables.

43304 **(FE—2346-8) Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977.** Humphrey, J.P. (Dow Chemical Co., Midland, MI (USA). Hydrocarbons and Energy Research Dept.). 29 Apr 1977. Contract AC20-76LC10153. 26p. NTIS, PC A03/MF A01. Order Number DE83015549.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objective of this contract is to test the technical feasibility for the in situ processing of the Antrim oil shale within the Mississippian-Devonian black shale sequence of the Michigan Basin to produce energy values. The field investigations will involve well development, fracturing, underreaming, fracture assessment, in situ ignition, and extraction of hydrocarbons. Supporting contributions will be made by subcontractors in the areas of shale characterization, environmental measurement, fracture assessment, and public policy. This is the second quarterly report for the Antrim oil shale contract which began October 1, 1976. The Dow well site in Sanilac County, Michigan, has been reactivated, and dewatering of the existing wells is complete. Negotiations are complete with a number of Michigan institutions for the technical support functions. 6 figures, 4 tables.

43305 **(SAND—83-0794) Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982.** Hommert, P.J. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 53p. NTIS, PC A04/MF A01. Order Number DE83015588.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The objective has been to acquire the ability to prescribe an efficient process for in situ recovery of a given oil shale resource. The overall efficiency of shale oil recovery processes is determined principally by a combination of sweep efficiency, retorting efficiency and volumetric efficiency. These individual efficiency components are related to the way in which the retort bed is prepared, the retorting technique employed, and the structural characteristics of the mine and in situ retorts. Therefore, the Sandia program addresses these three main areas: (1) bed preparation and characterization; retorting process; and structural stability. For convenience, this report is organized with most of the text under these main headings. Some of the highlights for this period are: (1) A post-burn coring effort on Geokinetics retort 23 has been completed. (2) A 100 kg laboratory vessel to be used for studying the effects of

permeability contrasts has been fabricated. Fielding and data acquisition on the D-series tests at Anvil Points were completed. (3) Preliminary design was completed for the first two single borehole tests to be performed by Sandia as part of the joint Rock Fragmentation Experimental Program. (4) Considerable advances have been made in the computational techniques to determine long-term fragment motion. Two computer codes, BUMP and BLOCKS, have been used to examine motion for a cratering geometry. (5) A series of tracer tests were completed at the LETC 150 ton retort. (6) A finite element analysis showing the effect of elevated temperature on retort roof stability was completed. As expected, the analysis indicates elevated temperatures increase the likelihood of roof collapse. 31 figures, 5 tables.

0405 Properties And Composition

43306 (LA—9777-MS) Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality. Peterson, E.J.; Wagner, P. (Los Alamos National Lab., NM (USA)). May 1983. Contract W-7405-ENG-36. 17p. NTIS, PC A02/MF A01. Order Number DE83014804.

This report summarizes the research efforts of Los Alamos National Laboratory in characterizing raw and spent shale samples from the Occidental Oil Shale, Inc., Logan Wash site in the Piceance Creek Basin of Colorado. Our activities have focused on the interaction of the raw material and the process variables and their influence on the ultimate identify and behavior of the spent shale, the resultant leachates, and the chemistry of other aqueous effluents. Both the raw shale material and the retorting process parameters influence the behavior of spent shale solids. The process parameters define the mineral reactions that occur in the spent shale, and the major and trace element residences and mobilities from the raw shale determine how extensively these elements are incorporated in the spent shale matrix and ultimately the composition of the leachate generated by the spent shale/water interaction. The leachate and the solid waste are dependent variables, and the raw shale and process parameters are independent variables. In this report, we summarize our experimental results, including the mineralogy trace element concentrations in solids, and leaching characteristics of the raw and spent shales. We also discuss implications for water quality, which may be affected by aquifer bridging and leaching of spent shales. A major purpose of our research has been to explore new environmental control strategies and to provide information to supplement other research efforts. 6 tables.

0409 Waste Research And Management

REFER ALSO TO CITATION(S) 43306

0410 Enviromental Aspects

REFER ALSO TO CITATION(S) 43306

05 NUCLEAR FUELS

0501 Reserves

REFER ALSO TO CITATION(S) 43325

43307 (CONF-8209149—8) Lake Way uranium deposit. French, R.R. (CSR Ltd., Sydney (Australia)). 1982. 5p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902550.

From Australian uranium symposium; Frankfurt, F.R. Germany (6 Sep 1982).

The Lake Way uranium deposit is a small- to medium-sized surface deposit located near the town of Wiluna which is approximately 820 kilometers northeast of Perth in Western Australia. The property is owned by two Australian companies...CSR Ltd. and VAM Ltd., thus 25% participating equity is available to a non-Australian party, if required.

43308 (CONF-8209149—9) Lake Way uranium project. Eakell, S.; French, R.R. (VAM Ltd., Melbourne (Australia); Delhi International Oil Div. of CSR, Adelaide (Australia)). 1982. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902561.

From Australian uranium symposium; Frankfurt, F.R. Germany (6 Sep 1982).

Several years ago Lake Way was considered by many to be too small and too low in grade to compete with the larger high grade deposits in other parts of Australia, and particularly in the Northern Territory. The pendulum has now swung and as far as Australian uranium resources are concerned Lake Way now has many advantages over the larger, richer deposits in other parts of Australia. These advantages are set out under appropriate headings (size, location, aboriginals, operating procedures, shipping, equity, and timing).

43309 (DOE/SR/00952—T4) Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium. Brookins, D.G. (New Mexico Univ., Albuquerque (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 169p. NTIS, PC A08/MF A01. Order Number DE83015555.

Portions are illegible in microfiche products.

In this module geological and geochemical data pertinent to locating, mining, and milling of uranium are examined. Chapters are devoted to: uranium source characteristics; uranium ore exploration methods; uranium reserve estimation for sandstone deposits; mining; milling; conversion processes for uranium; and properties of uranium, thorium, plutonium and their oxides and carbides.

43310 (GJO—100(83)) Statistical data of the uranium industry. (USDOE Grand Junction Area Office, CO (USA)). 1 Jan 1983. 94p. NTIS, PC A05/MF A01. Order Number DE83014846.

Portions are illegible in microfiche products.

This report is a compendium of information relating to US uranium reserves and potential resources and to exploration, mining, milling, and other activities of the uranium industry through 1982. The statistics are based primarily on data provided voluntarily by the uranium exploration, mining and milling companies. The compendium has been published annually since 1968 and reflects the basic programs of the Grand Junction Area Office of the US Department of Energy. Statistical data obtained from surveys conducted by the Energy Information Administration are included in Section IX. The production, reserves, and drilling data are reported in a manner which avoids disclosure of proprietary information.

0502 Exploration

REFER ALSO TO CITATION(S) 43307, 43308, 43309

43311 (CONF-8209149—3) Geography - outline of deposits, where they are, how much they contain. Hampson, D.C. (Uranium Information Centre Ltd., Melbourne (Australia)). 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902566.

From Australian uranium symposium; Frankfurt, F.R. Germany (6 Sep 1982).

This paper gives a general idea of when and where the Australian uranium deposits were found and their size: Radium Hill, Beverley, Koongarra, Nabarlek, Ranger, Jabilka, Honeymoon, Yeelirie, Ben Lomond, and Lake Way. (DLC)

43312 (DOE/GJ/01664—T4) Airborne gamma-ray spectrometer and magnetometer survey, Dryden, Texas; Indian Wells, Texas. Volume I. Detail area. Final report. (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). [nd]. Contract AC13-76GJ01664. 97p. NTIS, PC E08/MF $12.50. Order Number DE83011310.

Portions are illegible in microfiche products; Includes 38 sheets of 48x reduction microfiche.

An airborne combined radiometric and magnetic survey was performed for the Department of Energy (DOE) over the Dryden Detail Area and the Indian Wells Detail Area of southwestern Texas. The Dryden Detail Area is within the coverage of the Sanderson, Dryden, Thurston, Pandale, Dryden Crossing, Malvado, and Langtry 15' map sheets of the National Topographic Map Series (NTMS). The Indian Wells Detail is within the coverage of the Indian Wells 15' map sheets of the NTMS. The survey was part of DOE's National Uranium Evaluation (NURE) program. Radiometric data were corrected for live time, aircraft and equipment background, cosmic background, atmospheric radon, Compton scatter, and altitude dependence. The corrected data were statistically evaluated, gridded, and contoured to produce maps of the radiometric variables, uranium, potassium, and thorium; their ratios; and the residual magnetic field. These maps have been analyzed in order to produce a multi-variant analysis contour map based on the radiometric response of the individual geological units. A geochemical analysis has been performed, using the radiometric and magnetic contour maps, the multi-variant analysis map, and factor analysis techniques, to produce a geochemical analysis map for the area.

43313 **(GJBX—17(83)) System for obtaining high-integrity borehole fluid samples. National Uranium Resource Evaluation.** Roberts, E.H. (Bendix Field Engineering Corp., Grand Junction, CO (USA)). Jul 1983. Contract AC13-76GJ01664. 39p. NTIS, PC A03/MF A01. Order Number DE83015402.

Portions are illegible in microfiche products.

A high-integrity borehole fluid sampling system has been developed by Bendix Field Engineering Corporation, prime contractor for the US Department of Energy Grand Junction Area Office as a part of the National Uranium Resource Evaluation program. Through the use of a high-pressure positive-displacement pump of stainless steel coupled to a Teflon delivery line, the system is designed for delivery of an uncontaminated and unfractionated fluid sample to the surface from depths of up to 300 meters. Inflatable packers may be used to isolate a zone of interest from which the representative sample is subsequently pumped. Specially designed sample receivers are used for storage of the sample under conditions comparable to downhole pressure conditions. In contrast to systems using conventional packer systems developed primarily for the oil industry, this system is capable of sealing uncased boreholes having large borehole caliper variations without the necessity of withdrawing the tool to change the packers. In addition, this new system does not introduce foreign material into the borehole since the system uses only resident borehole fluids to effect packer inflation. Thus, long-term sampling programs may be accomplished without compromising the integrity of subsequent sample acquisition.

43314 **(GJBX—31-83-Vol.1) Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 98p. NTIS, PC E10/MF $14.75. Order Number DE83014852.

Portions are illegible in microfiche products; Includes 47 sheets of 48x reduction microfiche.

An airborne combined radiometric and magnetic survey was performed for the Department of Energy (DOE) over the Durango A, Durango B, Durango C, and Durango D Detail Areas of southwestern Colorado. The Durango A Detail Area is within the coverage of the Needle Mountains and Silverton 15' map sheets, and the Pole Creek Mountain, Rio Grande Pyramid, Emerald Lake, Granite Peak, Vallecito Reservoir, and Lemon Reservoir 7.5' map sheets of the National Topographic Map Series (NTMS). The Durango B Detail Area is within the coverage of the Silverton 15' map sheet and the Wetterhorn Peak, Uncompahgre Peak, Lake City, Redcloud Peak, Lake San Cristobal, Pole Creek Mountain, and Finger Mesa 7.5' map sheets of the NTMS. The Durango C Detail Area is within the coverage of the Platoro and Wolf Creek Pass 15' map sheets of the NTMS. The Durango D Detail Area is within the coverage of the Granite Lake, Cimarrona Peak, Bear Mountain, and Oakbrush Ridge 7.5' map sheets of the NTMS. Radiometric data were corrected for live time, aircraft and equipment background, cosmic background, atmospheric radon, Compton scatter, and altitude dependence. The corrected data were statistically evaluated, gridded, and contoured to produce maps of the radiometric variables, uranium, potassium, and thorium; their ratios; and the residual magnetic field. These maps have been analyzed in order to produce a multi-variant analysis contour map based on the radiometric response of the individual geological units. A geochemical analysis has been performed, using the radiometric and magnetic contour maps, the multi-variant analysis map, and factor analysis techniques, to produce a geochemical analysis map for the area.

43315 **(GJBX—31-83-Vol.2B-DD) Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 291p. NTIS MF A01. Order Number DE83014850.

Microfiche only, copy does not permit paper copy reproduction.

This volume comprises eight appendices containing the following information for the Durango D detail area: flight line maps, geology maps, explanation of geologic legend, flight line/geology maps, radiometric contour maps, magnetic contour maps, multivariant analysis maps, and geochemical factor analysis maps.

43316 **(GJBX—31-83-Vol.2B-DB) Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 234p. NTIS, PC A11/MF A01. Order Number DE83014848.

Portions are illegible in microfiche products.

This volume comprises magnetic and ancillary profiles for the Durango B detail area.

43317 **(GJBX—31-83-Vol.2C-DA) Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 115p. NTIS MF A01. Order Number DE83014826.

Microfiche only, copy does not permit paper copy reproduction.

This volume contains three appendices: magnetic contour maps, multi-variant analysis maps, and geochemical factor analysis. These maps are of the Durango A detail area.

43318 **(GJBX—31-83-Vol.2B-DC) Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 161p. NTIS, PC A08/MF A01. Order Number DE83014849.

Portions are illegible in microfiche products.

This volume comprises eight appendices containing the following information for the Durango C detail area: flight line maps, geology maps, explanation of geologic legend, flight line/geology maps, radiometric contour maps, magnetic contour maps, multivariant analysis maps, and geochemical factor analysis maps.

43319 **(GJBX—31-83-Vol.2A-DA) Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 520p. NTIS MF A01. Order Number DE83014873.

Microfiche only, copy does not permit paper copy reproduction.

This volume contains geology of the Durango A detail area, radioactive mineral occurences in Colorado, and geophysical data interpretation. Eight appendices provide the following: stacked profiles, geologic histograms, geochemical histograms, speed and altitude histograms, geologic statistical tables, geochemical statistical tables, magnetic and ancillary profiles, and test line data.

43320 **(GJBX—31-83-Vol.2A-DC) Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II A. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 351p. NTIS MF A01. Order Number DE83014824.

Microfiche only, copy does not permit paper copy reproduction.

Geology of Durango C detail area, radioactive mineral occurrences in Colorado, and geophysical data interpretation are included in this report. Eight appendices provide: stacked profiles, geologic histograms, geochemical histograms, speed and altitude histograms, geologic statistical tables, magnetic and ancillary profiles, and test line data.

43321 **(GJBX—31-83-Vol.2C-DB) Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 222p. NTIS MF A01. Order Number DE83014851.

Microfiche only, copy does not permit paper copy reproduction.

This volume contains eight appendices: flight line maps, geology maps, explanation of geologic legend, flight line/geology maps, radiometric contour maps, magnetic contour maps, multivariant analysis maps, and geochemical factor analysis maps. These appendices pertain to the Durango B detail area.

43322 **(GJBX—31-83-Vol.2A-DD) Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 220p. NTIS MF A01. Order Number DE83014825.

Microfiche only, copy does not permit paper copy reproduction.

This volume contains geology of the Durango D detail area, radioactive mineral occurrences in Colorado, and geophysical data interpretation. Eight appendices provide: stacked profiles, geologic histograms, geochemical histograms, speed and altitude histograms, geologic statistical tables, geochemical statistical tables, magnetic and ancillary profiles, and test line data.

43323 **(GJBX—31-83-Vol.2A-DB) Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 422p. NTIS MF A01. Order Number DE83014823.

Microfiche only, copy does not permit paper copy reproduction.

The geology of the Durango B detail area, the radioactive mineral occurrences in Colorado and the geophysical data interpretation are included in this report. Seven appendices contain: stacked profiles, geologic histograms, geochemical histograms, speed and altitude histograms, geologic statistical tables, geochemical statistical tables, and test line data.

43324 **(GJBX—31-83-Vol.2B-DA) Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report.** (High Life Helicopters, Inc., Puyallup, WA (USA); QEB, Inc., Lakewood, CO (USA)). 1983. Contract AC13-79GJ01692. 316p. NTIS MF A01. Order Number DE83014847.

Paper copy only, copy does not permit microfiche production.

This volume comprises five appendices pertaining to the Durango A detail area: flight line maps, geology maps, explanation of geologic legend, flight line/geology maps, and radiometric contour maps.

0503 Mining

REFER ALSO TO CITATION(S) 43309

43325 **(GJBX—30(83)) Investigation of sedimentary, mineralogical, chemical, and color patterns and associations in the Rio de Oro mine, McKinley County, New Mexico. National Uranium Resource Evaluation.** Austin, S.R.; Stocking, H.E. (Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations). Jul 1983. Contract AC13-76GJ01664. 80p. NTIS, PC E05/MF A01; . Order Number DE83014853.

Portions are illegible in microfiche products; Includes 3 sheets of 24x reduction microfiche.

Data from detailed sections of the Rio de Oro mine in McKinley County, New Mexico are presented.

0504 Feed Processing

REFER ALSO TO CITATION(S) 43309, 43310

43326 **(RFP-ABST—09) Process for recovering uranium contained in phosphate compounds.** de Marteau, J.M.; Sorale, S. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). Jul 1983. Contract AC04-76DP03533. Translation of Japanese Patent 1980-113,629. 8p. NTIS, PC A02/MF A01. Order Number DE83015028.

Portions are illegible in microfiche products.

A process is claimed for recovering uranium from a uranium-containing acid leach solution, consisting of extraction of the uranium leach solution with an organic extractant solution containing a pyrophosphoric dialkyl ester, a diluent and a solubilizing agent for uranium-ammonium pyrophosphoric dialkyl ester double salt in at least a proportion of 0.5 mole per mole of the above pyrophosphoric dialkyl ester.

43327 **(NLCO-tr—17) Operating experience in the J.E.N. with a fluidized-bed pilot plant.** Rodrigo Otero, A.; Gonzalez Garcia, V. Translated from *Energia Nuclear (Madrid) ;* 17: No. 86, 407-415(1973). Contract AC05-76OR01156. 13p. NTIS, PC A02/MF A01. Order Number DE83013083.

Experience was acquired at J.E.N. in the design and operation of a pilot plant of fluidized-bed reactors conceived and developed in this organization. The plant operated a sufficient number of hours for us to guarantee correct operation and to become acquainted with many problems, some of which could in no way be foreseen prior to the beginning of the study. The knowledge of scale-up of this type of plant was very limited and possibly of little significance, since the jump made was merely from reactors 70 mm in diameter to those 220 mm in diameter. On the other hand, parameters with criteria oriented to obtaining specific knowledge of scale-up were not considered or measured during this jump, but the study was directed exclusively toward obtaining data on the processes, as well as design and operation. Nevertheless, the experience acquired was very valuable and impossible to obtain by other means. It is no exaggeration to say that without the pilot plant study, the development of commercial installations with any probability of success would be impossible. The problems that arose were so different and complex that their resolution was possible only through experimentation, which does not mean that scale-up can be approached with this experience and with a complete guarantee of success. This will naturally depend to a great extent on the size of the final installation, but any step taken in this direction has a high degree of risk. Very possibly, similarly as in the pilot plant, hitherto unexpected problems would again appear in the commercial installation, although the chances of their arising have been reduced as a result of the experience gained on the small scale.

43328 **(NLCO-tr—16) Production of UO_2, UO_3, and UF_4.** Rodrigo Otero, A.; Gonzalez Garcia, V. Translated from *Energia Nuclear (Madrid) ;* 16: No. 77, 333-353(May-Jun 1972). Contract AC05-76OR01156. 34p. NTIS, PC A03/MF A01. Order Number DE83013079.

Portions are illegible in microfiche products.

The method of UF_4 production begins with the thermal decomposition of uranyl nitrate, followed by reduction and fluorination, with all dry process operations being carried out in continuous fluidized-bed reactors. In this method it is possible to distinguish two different parts: formation of the solid phase and transformation of this phase into UF_4. In the first phase, dilute uranyl nitrate (100 g U/liter) is transformed into solid UO_3; this phase change involves serious problems deriving from the intermediate stages of decomposition and from the operability of the reactor. The dilute nitrate solution is concentrated by a conventional process that is well known in chemical engineering (evaporation) until it reaches the level of 1180 g U/liter which represents the hexahydrate, $UO_2(NO_3)_2.6H_2O$, and it is this compound that is decomposed, by calcination, to UO_3. The transformation of the solid phase is also carried out in two consecutive steps: UO_3 is reduced to UO_2, and this is fluorinated to UF_4. Thus, there are four steps in the process: evaporation, calcination, reduction, and fluorination.

0505 Enrichment

43329 (DOE/SR/00952—T2) Nuclear-fuel-cycle education: Module 3. Enrichment of uranium. Dalton, G.R.; Eckhoff, N.D.; Wethington, J.A. Jr. (Florida Univ., Gainesville (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 136p. NTIS, PC A07/MF A01. Order Number DE83015556.

Portions are illegible in microfiche products.

The following methods of uranium enrichment are discussed: gaseous diffusion; centrifugal extraction; centrifugal nozzle separation; and laser isotope separation.

0507 Fuels Production And Properties

REFER ALSO TO CITATION(S) 43358, 43405

0508 Spent Fuels Reprocessing

REFER ALSO TO CITATION(S) 43375

43330 (DOE/SR/00952—T3) Nuclear-fuel-cycle education: Module 1. Nuclear fuel cycle overview. Eckhoff, N.D. (ed.). (Kansas State Univ., Manhattan (USA)). Jul 1981. Contract AS09-76SR00952. 166p. NTIS, PC A08/MF A01. Order Number DE83015582.

Portions are illegible in microfiche products.

This educational module is an overview of the nuclear-fule-cycle. The overview covers nuclear energy resources, the present and future US nuclear industry, the industry view of nuclear power, the International Nuclear Fuel Cycle Evaluation program, the Union of Concerned Scientists view of the nuclear-fuel-cycle, an analysis of this viewpoint, resource requirements for a model light water reactor, and world nuclear power considerations.

43331 Assay of spent fuel by a simple reactivity method. Lee, D.M.; Lindquist, L.O. (Los Alamos National Laboratory, PO Box 1663, Los Alamos, NM 87545). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* 30: No. 1, 516-520(Feb 1983). Contract W-7405-ENG-36.

A new method for the assay of spent-fuel assemblies has been developed that eliminates the need for external isotopic neutron sources, yet retains the advantages of an active interrogation system. The assay is accomplished by changing the reactivity of the system and correlating the measurements to burnup.

0509 Transport And Storage

43332 (CONF-8209149—7) Logistics of Australian uranium in the world market. Harmon, D. (Urangesellschaft m.b.H. und Co. K.G., Frankfurt am Main (Germany, F.R.); Edlow International Co., Washington, DC (USA)). 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902562.

From Australian uranium symposium; Frankfurt, F.R. Germany (6 Sep 1982).

The labor union and physical obstacles to shipping Australian uranium to the marketplace are mentioned. Cost of the logistical system comprises five separate components: equipment cost, insurance cost, freight and security cost, interest cost, freight and security cost, interest cost, and administrative cost. Uranium can be delivered from a site within Australia to a European converter for about 32 cents per lb U3O8, or to a North American converter for about 44 cents/lb U3O8. (DLC)

43333 (PNL-SA—9872) Transportation packaging for processed transuranic waste. Andrews, W.B.; Alzheimer, J.M.; Jackson, W.B.; Jones, R.H. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 18p. (CONF-820705—14). NTIS, PC A02/MF A01. Order Number DE83014534.

From 2. joint ASME/ANS nuclear engineering conference; Portland, OR, USA (25 Jul 1982).

Processing of transuranic (TRU) wastes from US defense research and weapons production with surface dose rates < 2 mSv/hr (200 mR/hr) is being considered by the US Department of Energy (DOE) as a means of improving radionuclide retention in transportation and waste disposal. This project was funded by DOE at the Pacific Northwest Laboratory to develop preconceptual package designs for transportation of processed TRU waste products. Four design concepts were developed. The Type A package is designed for direct filling of processed TRU waste. This package could be shipped under the low-level solids rules in proposed revisions to transportation regulations or in a reusable Type B overpack. Two alternative reusable Type B overpack designs were developed for the Type A package. The fourth concept is a disposable Type B package for direct filling by processed TRU wastes.

43334 (SAND—82-1937C) Generic evaluation of the radiological impacts of transportation in the nuclear fuel cycle. Luna, R.E.; Madsen, M.M.; Wilmot, E.L.; Taylor, J.M. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 9p. (CONF-830528—44). NTIS, PC A02/MF A01. Order Number DE83013991.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

Portions are illegible in microfiche products.

Exposure of the general public during the transportation of nuclear fuel cycle materials may occur by one of four mechanisms: incident-free exposure, vehicular accidents, deviations from approved quality-assurance practices, and breaches of security/safeguards. This study dealt with the first two mechanisms, although a qualitative evaluation of quality-assurance incidents was also performed. Security-related incidents were not specifically addressed in this study. The results of the analysis indicate that incident free fuel cycle transportation exposures would lead to about 35 person-rem per year per GW(e) of installed nuclear capacity, no uranium or plutonium recycle, 65 person-rem per year with recycle, and 24 person-rem per year under current conditions, i.e., no recycle and limited spent fuel movements. The annual expected value of radiological risk associated with vehicular accidents is estimated to be 27 person-rem per GW(e) (no recycle), 26 person-rem (with recycle), and 25 person-rem (current practice).

43335 (SAND—82-1951C) The benchmarking of RADTRAN II. Madsen, M.M.; Wilmot, E.L.; Taylor, J.M. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 9p. (CONF-830528—46). NTIS, PC A02/MF A01. Order Number DE83015100.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

Radiological impacts of transporting radioactive material by truck, air, rail, and water can be analyzed with the RADTRAN code. Consequences of incident-free transportation (also referred to as normal or accident-free transportation) as well as risks from vehicular accidents occurring during the transport process can be evaluated. RADTRAN II is the significantly revised version of this

code. The major revisions of this code are briefly summarized and a discussion of verifications is included.

43336 (SAND—82-1952C) Truck transportation of radioactive materials. Madsen, M.M.; Wilmot, E.L. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 9p. (CONF-830528—45). NTIS MF A01. Order Number DE83015102.

From 7. international symposium on packaging and transportation of radioactive materials; New Orleans, LA, USA (15 May 1983).

Microfiche only, copy does not permit paper copy reproduction.

Analytical models in RADTRAN II are used to calculate risks to population subgroups such as people along transport routes, people at stops, and crewman. The stops model, which calculates the dose to persons adjacent to the transport vehicle while it is stopped, frequently provides the largest contribution to incident-free radiological impacts. Components such as distances from the vehicle containing radioactive material to nearby people at stops, stop duration, and number of crew members are required for the stops model as well as other incident-free models. To provide supporting data for RADTRAN II based on operational experience, selected truck shipments of radioactive material were observed from origin to destination. Other important aspects of this program were to correlate package size to effective shipment transport index (TI) using radiological surveys and to characterize population distributions and proximities of people to the shipment at a generic truck stop.

0510 Marketing And Economics

REFER ALSO TO CITATION(S) 43344, 43830, 44017

0520 Waste Management

REFER ALSO TO CITATION(S) 43393, 43395, 43398, 43399, 43400, 43835, 44008, 44354, 44711, 44712, 44721, 44813, 44817, 44818, 44819, 44820, 44823

43337 (AECL—6834) Fuel isolation research for the Canadian Nuclear Fuel Waste Management Program. (Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment). Jun 1982. 65p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701829.

This document is intended to give a broad outline of the Fuel Isolation program and to indicate how this program fits into the overall framework of the Canadian Nuclear Fuel Waste Management Program. Similar activities in other countries are described, and the differences in philosophy behind these and the Canadian program are highlighted. A program plan is presented that outlines the development of research programs that contribute to the safety assessment of the disposal concept and the development of technology required for selection and optimization of a feasible fuel isolation system. Some indication of the work that might take place beyond concept assessment, at the end of the decade, is also given. The current program is described in some detail, with emphasis on what the program has achieved to date and hopes to achieve in the future for the concept assessment phase of the waste management program. Finally, some major capital facilities associated with the fuel isolation program are described.

43338 (AECL—7685) Autoradiography of metallic matrices. Keller, N.A. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Apr 1982. 27p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701830.

One of the container designs being considered for the disposal of irradiated CANDU fuel bundles consists of a cylindrical titanium shell approximately 1.10 m in height and 0.84 m in diameter, into which is placed a basket fabricated from a close-packed array of thirty-seven 10 cm (4 in.) schedule 40 steel pipes. Two fuel bundles would be stacked into all but the central pipe, and the entire container filled with a low melting point metal. There is concern that shrinkage during solidification of this metal matrix may result in voids being present in the matrix near the outer shell of the container. One of the methods being considered to determine the presence of such voids is autoradiography. A theoretical study was carried out to determine the limitations of this technique. The results are discussed in detail in this report. It is concluded that while autoradiography appears feasible, it will require using a complex multi-detector system to detect voids of a reasonable size.

43339 (AEEW-R—1534) Cement radwaste solidification studies. Third annual report. Brown, D.J.; James, J.M.; Lee, D.J.; Smith, D.L.; Walker, A.T. (UKAEA Atomic Energy Establishment, Winfrith). Mar 1982. 57p. (DOE-RW—82.049). AEEW, Technology Division, Winfrith, Dorchester, England.

This report summarizes the third year's work of cement radwaste studies carried out at AEE Winfrith during 1981 on the encapsulation of medium- and low-active waste in cement. During the year more emphasis has been placed on the work which is directly related to the solidification of SGHWR active sludge. Information has been obtained on the properties of 220 dm^3 drums of cemented waste. The use of cement grouts for the encapsulation of solid items has also been investigated during 1981.

43340 (AERE-R—10389) Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution. Burnay, S.G.; Dyson, J.R. (UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.). Aug 1982. 34p. (DOE-RW—82-063). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702198.

Inorganic and organic IX resins have been incorporated into a water-tolerant epoxide resin system. The effect of γ-irradiation to 5×10^9 rads on the mechanical properties of samples containing wet IX resins has been investigated. It was found that although there is a marked embrittlement of the epoxide matrix, useful mechanical properties are retained up to this dose. Gas evolution studies under irradiation and thermogravimetric analyses have also been carried out.

43341 (CEA-CONF—6278) Actual point about fission products vitrification. Bonniaud, R. (CEA Etablissement de la Vallee du Rhone, 30 - Bagnols-sur-Ceze (France)). May 1982. 18p. (In French). (CONF-8205164—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701825.

From French Nuclear Energy Society meeting on nuclear waste; Paris, France (13 May 1982).

The main characteristics concerning the continuous vitrification process for the confinement of fission product solutions operated at AVM are summarized. The general principle of a vitrification plant is described. The AVM plant efficiency as also its conception of consumable parts interchangeability are satisfying. The evolution of the process and its application developed in two ways: a more spaced installation conception and the improvement of the weak points remarked at AVM, as also the capacity of output. Two industrial units are designed at La Hague. The future evolution of the process aims at manufacturing glass at higher temperatures about 1400°C. Some problems remain to be resolved for using ceramic melters associated with a calcination unit. The studies provide for a satisfying behaviour for the material to long-term. The risks of damage by crystallisation, leaching and effects of alpha emission are analysed.

43342 (CEA-CONF—6414) Safety of storage facilities for LMFBR spent fuels. Lefort, G.; Puit, J.C. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)). Apr 1982. 18p. (In French). (CONF-8204122—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702074.

From Seminar on fuel storage; Leningrad, USSR (20 Apr 1982).

Storage conditions for the cooling of fast neutron spent fuel assembly, before reprocessing, will be adapted specifically to this fuel cycle, but in a preliminary testing period it is better to take advantage of the industrial storage conditions already used for spent

fuel of light water reactors, even if no extrapolation is possible in the future. In this aim fuel assemblies are dismantled, as soon as thermal conditions allow it, and pins are gathered in leak proof containers in a gas atmosphere and put in a cooling pool. This solution gives good results but studies and experiments are resumed, for future processing, for safe, easy and economical transport and storage conditions.

43343 **(DOE/NV/10162—7) Preliminary review and summary of the potential for tectonic, seismic, and volcanic activity at the Nevada Test Site defense waste disposal site.** Metcalf, L.A. (Nevada Univ., Reno (USA). Desert Research Inst.). Mar 1983. Contract AC08-81NV10162. 60p. NTIS, PC A04/MF A01. Order Number DE83014882.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A change from compressional to extensional tectonics, which occurred about 17 m.y. ago, marks the emergence of the present tectonic regime in the southern Great Basin. Crustal extension is continuing at the present time, oriented in a NW-SE direction in the NTS region. Concurrently with the onset of crustal extension a system of NW- and NE-trending shear zones developed, along which mutual offset has occurred. Present seismic and tectonic activity in the NTS region is concentrated along the intersections of the shear zones and in areas of deep basin formation. Natural historic seismicity of the NTS region has been low to moderate. Seismic hazard assessments suggest a maximum magnitude 6-7 earthquake, associated with a maximum peak acceleration of 0.7 to 0.9 g, is probable for the NTS. A return period of 12,700 to 15,000 y for the maximum peak acceleration indicates a relatively low seismic hazard. Silicic volcanism in the NTS region was active from 16 to 6 m.y. ago, followed by a transition to basaltic volcanism. The tectonic settings most favorable for Quaternary basaltic activity are areas of young basin-range extension, caldera ring fracture zones, and intersections of conjugate shear zones. Probability calculations for the Yucca Mountain waste repository result in a volcanic disruption hazard of 10^{-8} to 10^{-9}/y. This value is extremely low and is probably representative of the hazard at Frenchman Flat. However, due to its tectonic setting, Frenchman Flat may be an area conducive to future basaltic volcanism; further investigation is needed to properly assess volcanic hazard.

43344 **(DOE/S—0020/1) Report on financing the disposal of commercial spent nuclear fuel and processed high-level radioactive waste.** Benny, R.I.; Sprecher, W.M. (USDOE Nuclear Waste Policy Act Project Office, Washington, DC). Jul 1983. 55p. NTIS, PC A04/MF A01. Order Number DE83014886.

The major conclusions and observations which emerge from an extensive analysis of the cost of implementing a nuclear waste disposal program are: Projected revenues generated from the 1.0 mill per kwhr fee mandated by the Act are sufficient to cover the full range of reference case program costs, assuming 3% annual inflation and nuclear installed capacity of 165 gigawatts-electric by the year 2000. Total estimated costs of the reference waste disposal program, encompassing either spent nuclear fuel disposal or reprocessing waste disposal, range between $18 to 20 billion in constant 1982 dollars. Sensitivity case analyses established upper and lower program cost bounds of $28 billion and $16 billion, respectively (in 1982 dollars). In terms of discounted levelized unit costs, the disposal of spent fuel equates to $122 to 125 per kilogram (uranium) compared with $115 to 119 per kilogram for the reprocessing waste equivalent. The levelized unit costs for reprocessing exclude the solidification of liquid wastes. Such costs are estimated to be $8 per kilogram. Discounted levelized unit costs corresponding to the upper and lower limits of the sensitivity cases equate to $176 per kilogram and $107 per kilogram. The 1.0 mill per kwhr fee will be reviewed annually and adjusted, if necessary, to accommodate changes in program costs due to inflation and program shifts. When adjustments are made for applicable discount rates, inflation, repository design changes, and other factors, levelized unit costs for the reference case presented in this analysis agree closely with the results of two previous Department of Energy (DOE) studies concerning charges for spent fuel storage and disposal services provided by the federal government.

43345 **(DOE/SR/00952—T7) Nuclear-fuel-cycle education: Module 8. Waste management.** O'Hara, F.A.; Roberts, L.; Daglish, J. (Ohio State Univ., Columbus (USA); UKAEA Atomic Energy Research Establishment, Harwell; Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 123p. NTIS, PC A06/MF A01. Order Number DE83015187.

Portions are illegible in microfiche products.

This module has chapters devoted to: an international perspective on radioactive waste management; high-level waste management research; transuranic waste; high-level radioactive waste; and low-level waste in the light water reactor fuel cycle without reprocessing.

43346 **(DOE/UMT—0064) Aging test results of an asphalt membrane liner.** Buelt, J.L.; Barnes, S.M. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 57p. (PNL—4752). NTIS, PC A04/MF A01. Order Number DE83015176.

The objective of the asphalt aging study described in this report was to determine the expected performance lifetime of a catalytically airblown asphalt membrane as a seepage barrier for inactive uranium mill tailings. The study, conducted by Pacific Northwest Laboratory for the Department of Energy's Uranium Mill Tailings Remedial Action Program, showed through chemical compatibility tests that the asphalt membrane is well suited for this purpose. The chemical compatibility tests were designed to accelerate the aging reactions in the asphalt and to determine the accelerated aging effect. Higher temperatures and oxygen concentrations proved to be effective acceleration parameters. By infrared spectral analysis, the asphalt was determined to have undergone 7 years of equivalent aging in a 3-month period when exposed to 40°C and 1.7 atm oxygen pressure. However, the extent of aging was limited to a maximum penetration of 0.5% of the total liner thickness. It was concluded that the liner could be expected to be effective as a seepage barrier for at least 1000 years before the entire thickness of the liner would be degraded.

43347 **(DOE/UMT—0263) Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings.** Dreesen, D.R.; Bunker, M.E.; Cokal, E.J.; Denton, M.M.; Starner, J.W.; Thode, E.F.; Wangen, L.E.; Williams, J.M. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 141p. (LA—9660-UMT-Vol.1). NTIS, PC A07/MF A01. Order Number DE83015420.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The goal of these studies on tailings characterization was to determine the mineralogical and elemental composition of various tailings materials, as well as to evaluate their contaminant leachability and radon emanation properties. Extreme variability within and between tailings piles was noted for major, minor, and trace elements and radionuclides. The most commonly enriched contaminants found in 12 tailings site composites were As, Se, U, and V. The ^{226}Ra content of these composites was consistently lower than the most commonly cited estimates. The most common highly leachable components of these tailings include potentially toxic trace contaminants such as U, As, Mo, and Se and major constituents such as Ca, SO_4^{-2}, Na, Mn, and V. Appreciable leachable metal ions were found for a few tailings materials. These studies have shown the necessity of complete characterization of each individual type of tailings because of differences in total and leachable constituents between tailings. A pilot study on data derived from neutron activation analysis of core samples from two tailings sites indicates that, by statistical treatments such as cluster analysis, samples can be separated into distinct classes such as tailings, contaminated soil, or background soil. This information could be very significant in determining the degree of contaminant migration beneath a tailings pile. Results on sulfuric acid leaching tests indicated that appreciable quantities of U, V, Mo, and Co could be extracted form some types of tailings. An economic analysis of reprocessing has shown that for piles requiring relocation as part of remedial action, sufficient mineral values can be extracted from some tailings to provide a net economic benefit.

43348 (DOE/UMT—0265) Research on the characterization and conditioning of uranium mill tailings. III. Summary of uranium mill tailings conditioning research and implications regarding remedial actions. Dreesen, D.R.; Cokal, E.J.; Thode, E.F.; Williams, J.M. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 8p. (LA—9660-UMT-Vol.3). NTIS, PC A02/MF A01. Order Number DE83014810.

This report summarizes the findings of research on uranium mill tailings conditioning technology development performed for the Department of Energy's (DOE) Uranium Mill Tailings Remedial Action Project (UMTRAP). Hazards and risks posed by tailings piles are discussed in relation to the goal of conditioning the tailings to reduce these hazards. The results of our efforts regarding characterization of tailings, removal of radionuclides, mineral recovery, thermal stabilization, and engineering/economic analysis of conditioning are presented. The implications of these results for remedial action plans are discussed and conclusions regarding the applicability of these technologies are also presented.

43349 (DPSPU—83-30-4-Rev.) Immobilizing defense waste at the Savannah River Project. Schneider, R.F.; Davis, J.C.; Mellen, J.B. (Bechtel National, Inc., San Francisco, CA (USA); Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). Mar 1983. Contract AC09-76SR00001. 22p. (CONF-830347—2). NTIS, PC A02/MF A01. Order Number DE83012866.

From Atomic industrial forum fuel cycle conference; Kansas City, MO, USA (20 Mar 1983).

The Department of Energy is proceeding with a project to construct and operate a Defense Waste Processing Facility at the Savannah River Plant. Because of the two phases in the waste, the project will consist of two distinct parts: the first to treat and immobilize the sludge portion of the waste, and the second to deal with the evaporated liquid portion or salt waste. Firm design for the sludge vitrification plant is now underway. The vitrification process using borosilicate glass as the matrix materials is discussed.

43360 (EGG—2262) Incinerated waste consolidation studies. Pattengill, M.G.; Bentzen, E.H. III; Roushey, W.J.; Rau, E.L. (Colorado School of Mines, Golden (USA). Research Inst.). Jun 1983. Contract AC07-76ID01570. 166p. NTIS, PC A08/MF A01. Order Number DE83015665.

Portions are illegible in microfiche products.

Products from rotary-kiln incineration studies previously conducted at Colorado School of Mines Research Institute on simulated transuranic waste materials were separated into size fractions. Each size fraction was then consolidated by cementing into drums. The purposes of the study were to determine the effectiveness of various types of equipment in separating the fine <1/4-in. ash from >1/4-in. incinerated waste and to study and evaluate various procedures involved in the use of portland cement concrete in consolidating incinerated simulated transuranic waste materials after size separation. Results of the study showed that either a trommel drum or a vibrating screen device produced the highest separation efficiency and met the operating requirements of no hang-up of material, minimal screen plugging, low number of moving parts, and a small space requirement. Sawing the cured drums of consolidated material showed that mixing <1/4-in. ash into the portland cement grout before pouring and vibrating the grout into the >1/4-in. material produced a sound, solid product with no voids. No significant temperature rise was recorded inside the consolidated drums during the 7 days of monitoring.

43351 (EGG-M—01683) Regional compacting for low-level waste management: an innovative approach in national problem solving. Levin, G.B.; Nern, C.F. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 4p. (CONF-830609—41). NTIS, PC A02/MF A01. Order Number DE83014956.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

The nature of the current efforts by the states to institute a reliable national system for low-level radioactive waste management is analyzed. The history of low-level waste management over the last five years is not detailed. It is sufficient to say that there has been a seriously diminished availability of commercial disposal capacity for low-level waste. Some observations and insights into the process the nation has undertaken to solve this problem are offered.

43352 (EGG-M—11783) Summary of INEL waste reduction/treatment facilities: SWEPP, PREPP, WERF. (Idaho National Engineering Lab., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 5p. (CONF-830650—2). NTIS, PC A02/MF A01. Order Number DE83015444.

From FRG/US workshop on size reduction and decontamination facilities; Karlsruhe, F.R. Germany (27 Jun 1983).

The Idaho National Engineering Laboratory (INEL) is currently designing and constructing two pilot plants to demonstrate methods for retrieving, processing, and certifying the stored TRU waste for shipment and experimental disposal at the Waste Isolation Pilot Plant (WIPP). Waste retrieval, examination, certification, and preparation for shipment will be performed at the Stored Waste Examination Pilot Plant (SWEPP). The waste processing activities will be performed in the Process Experimental Pilot Plant (PREPP). In addition to the SWEPP and PREPP TRU waste treatment facilities, the INEL is constructing a Waste Experimental Reduction Facility (WERF) to demonstrate efficient low-cost waste volume reduction techniques for low activity (< 10 mrem/h) beta-gamma waste. The WERF includes equipment for waste sorting and sizing, metallic waste melting, combustible waste incineration, and off-gas treatment. Brief summaries of these three facilities are given.

43353 (EGG-M—11883) Automated NDT techniques in radioactive waste management. Barna, B.A.; Brown, B.W.; Anderson, B.C. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 3p. (CONF-830652—2). NTIS, PC A02/MF A01. Order Number DE83015440.

From Automated non destructive evaluation conference; Idaho Falls, ID, USA (28 Jun 1983).

Portions are illegible in microfiche products.

The prime NDT method selected for characterization of the waste is real-time x-radiography (RTR). An RTR system specifically designed for the TRU waste inspection is currently being used to develop the best techniques for waste certification. It is based on a standard 420 kV constant potential x-ray machine with a rare-earth fluorescing screen (gadolinium oxysulfide) functioning as an image converter. The low-light-level image produced on the screen is picked up by a CCTV camera with an image intensifier coupled to a plumbicon imaging tube. The system was designed for automated waste container handling and translation. Image analysis is not currently automated, although the CCTV image is digitized to allow signal averaging and edge enhancement through digital filtering. The digitized image is available through an IEEE 488 I/O port for more sophisticated computerized analysis.

43354 (EGG-WM-F—1-83-018) Thermal cycling and vibration response for PREPP concrete waste forms. Nielson, R.M.; Welch, J.M. (EG and G Idaho, Inc., Idaho Falls (USA)). Jun 1983. Contract AC07-76ID01570. 25p. NTIS, PC A02/MF A01. Order Number DE83014636.

Portions are illegible in microfiche products.

The Process Experimental Pilot Plant (PREPP) will process those transuranic wastes which do not satisfy the Waste Isolation Pilot Plant (WIPP) Waste Acceptance Criteria. Since these wastes will contain considerable quantities of combustible materials, incineration will be an integral part of the treatment process. Four basic types of PREPP ash wastes have been identified. The four types are designated high metal box waste, combustible waste, average waste, and inorganic sludge. In this process, the output of the incinerator is a mixture of ash and shredded noncombustible material (principally metals) which is separated into two sizes, -1/4 inch (under-size waste) and +- 1/4 inch (oversize waste). These wastes are solidified with hydraulic cement in 55-gallon drums. Simulated PREPP waste forms prepared by Colorado School of Mines Research Institute were subjected to thermal cycling and vibration testing to demonstrate compliance with the WIPP immobilization criterion. Although actual storage and transport conditions are expected to vary somewhat from those utilized in the testing protocol, the generation of only very small amounts of particulate suggests that the immobilization criterion should be routinely met for

similar waste form formulations and production procedures. However, the behavior of waste forms containing significant quantities of off-gas scrubber sludge or considerably higher waste loadings may differ. Limited thermal cycling and vibration testing of prototype waste forms should be conducted if the final formulations or production methods used for actual waste forms differ appreciably from those tested in this study. If such testing is conducted, consideration should be given to designing the experiment to accommodate a larger number of thermal cycles more representative of the duration of storage expected.

43355 **(IDO—10086(82)) Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982.** Watanabe, T. (EG and G Idaho, Inc., Idaho Falls (USA)). Jun 1983. Contract AC07-76ID01570. 224p. NTIS, PC A10/MF A01. Order Number DE83015666.

Portions are illegible in microfiche products.

The Solid Waste Information Management System (SWIMS) is a Department of Energy (DOE) information system for radioactive solid waste. This document is a summary of the FY 1982 data and the forecast data for FY 1983 reported by DOE sites. Detailed data are included in the appendices. The SWIMS data base contains data on the solid transuranic and solid low-level waste generated, buried, or stored at DOE sites. The burial and storage data include the period from site initiation through FY 1982.

43356 **(LA—9325-MS) Status of volcanic hazard studies for the Nevada Nuclear Waste Storage Investigations.** Crowe, B.M.; Vaniman, D.T.; Carr, W.J. (Los Alamos National Lab., NM (USA)). Mar 1983. Contract W-7405-ENG-36. 54p. NTIS, PC A04/MF A01. Order Number DE83015596.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Volcanism studies of the Nevada Test Site (NTS) region are concerned with hazards of future volcanism with respect to underground disposal of high-level radioactive waste. The hazards of silicic volcanism are judged to be negligible; hazards of basaltic volcanism are judged through research approaches combining hazard appraisal and risk assessment. The NTS region is cut obliquely by a N-NE trending belt of volcanism. This belt developed about 8 Myr ago following cessation of silicic volcanism and contemporaneous with migration of basaltic activity toward the southwest margin of the Great Basin. Two types of fields are present in the belt: (1) large-volume, long-lived basalt and local rhyolite fields with numerous eruptive centers and (2) small-volume fields formed by scattered basaltic scoria cones. Late Cenozoic basalts of the NTS region belong to the second field type. Monogenetic basalt centers of this region were formed mostly by Strombolian eruptions; Surtseyean activity has been recognized at three centers. Geochemically, the basalts of the NTS region are classified as straddle A-type basalts of the alkalic suite. Petrological studies indicate a volumetric dominance of evolved hawaiite magmas. Trace- and rare-earth-element abundances of younger basalt (<4 Myr) of the NTS region and southern Death Valley area, California, indicate an enrichment in incompatible elements, with the exception of rubidium. The conditional probability of recurring basaltic volcanism and disruption of a repository by that event is bounded by the range of 10^{-8} to 10^{-10} as calculated for a 1-yr period. Potential disruptive and dispersal effects of magmatic penetration of a repository are controlled primarily by the geometry of basalt feeder systems, the mechanism of waste incorporation in magma, and Strombolian eruption processes.

43357 **(LA—9510-MS) Evaluation of geochemical properties used in area-to-location screening for a nuclear waste repository at the Nevada Test Site.** Purson, J.D. (Los Alamos National Lab., NM (USA)). Mar 1983. Contract W-7405-ENG-36. 40p. NTIS, PC A03/MF A01. Order Number DE83014800.

The area-to-location screening of a potential site for a nuclear waste repository is dependent on geologic compatibility. Specifically, the geochemical properties of candidate locations are significant in the overall site evaluation. This report describes three geochemical factors or attributes and their application to an area-to-location screening of the southwestern quadrant of the Nevada Test Site and contiguous areas. These are only 3 of 31 attributes examined in the screening process. Geochemical and rock media considerations relevant to site screening include: (1) retardation by hydraulics - a study of ground-water movement through fractures vs a permeable matrix; (2) thermal stability of minerals - a measurement of undesirable mineral assemblages in the rock; and (3) retardation by sorption - an evaluation of the total sorptive capacity at a location, based on stratigraphy and lithology. Twelve potential host rocks situated in 20 locations are examined; 2 of these have consistently fewer favorable characteristics, and 6 others have generally fewer favorable characteristics than the 4 remaining rock units. The four units that appear most favorable by geochemical measures are the tuffaceous beds of Calico Hills, granite intrusives, the densely welded Topopah Spring tuff, and the Crater Flat Tuff at Yucca Mountain.

43358 **(LA—9655-MS) Pyrochemical recovery of plutonium fluoride reduction slag.** Christensen, D.C.; Rayburn, J.A. (Los Alamos National Lab., NM (USA)). Jul 1983. Contract W-7405-ENG-36. 13p. NTIS, PC A02/MF A01. Order Number DE83014802.

A process was developed for the pyrochemical recovery of plutonium from residues resulting from the PuF_4 reduction process. The process involves crushing the CaF_2 slag and dissolving it at 800°C in a $CaCl_2$ solvent. The plutonium, which exists either as finely divided metal or as incompletely reduced fluoride salt, is reduced to metal and/or allowed to coalesce as a massive button in the bottom of the reaction crucible. The recovery of plutonium in a 1-day cycle averaged 96%; all of the resulting residues were discardable.

43359 **(LA—9666-PR) Research and development related to the Nevada Nuclear Waste Storage Investigations. Progress report, October 1-December 31, 1982.** Ogard, A.E.; Daniels, W.R.; Vaniman, D.T. (comps.). (Los Alamos National Lab., NM (USA)). May 1983. Contract W-7405-ENG-36. 55p. NTIS, PC A04/MF A01. Order Number DE83014805.

This report summarizes the contribution of the Los Alamos National Laboratory to the Nevada Nuclear Waste Storage Investigations for the first quarter of FY 1983.

43360 **(LBL—11829) Field assessment of the use of borehole pressure transients to measure the permeability of fractured rock masses.** Forster, C.B.; Gale, J.E. (Waterloo Univ., Ontario (Canada). Dept. of Earth Sciences). Jun 1981. Contract AC03-76SF00098. 133p. (SAC—34). NTIS, PC A07/MF A01. Order Number DE83015725.

Portions are illegible in microfiche products.

A field experiment to evaluate the transient pressure pulse technique as a method of determining the in-situ hydraulic conductivity of low permeability fractured rock was made. The experiment attempted to define: the radius of influence of a pressure pulse-test in fractured rock and the correlation between pressure-pulse tests and steady-state flow tests performed in five boreholes drilled in fractured granite. Twenty-five test intervals, 2 to 3 m in length, were isolated in the boreholes, using air-inflated packers. During pressure pulse and steady-state tests, pressures were monitored in both the test and observation cavities. Rock-mass conductivities were calculated from steady-state test results and were found to range from less than 10^{-11} to 10^{-7} cm/sec. However, there was no consistent correlation between the steady-state conductivity and the pressure pulse decay characteristics of individual intervals. These conflicting test results can be attributed to the following factors: differences in volumes of rock affected by the test techniques; effects of equipment configuration and compliance; and complexity of the fracture network. Although the steady-state flow tests indicate that hydraulic connections exist between most of the test cavities, no pressure responses were noted in the observation cavities (located at least 0.3 m from the test cavities) during the pulse tests. This does not mean, however, that the pressure-pulse radius of influence is <0.3 m, because the observation cavities were too large (about 7 liters). The lack of correlation between steady-state conductivities and the corresponding pressure pulse decay times does not permit use of existing single-fracture type curves to analyze pulse tests performed in multiple-fracture intervals. Subsequent work should focus on the detailed interpretation of field results

with particular reference to the effects of the fracture system at the test site.

43361 (LBL—12469) Numerical modeling to assess possible influence of the mine openings on far-field in-situ stress measurements at Stripa. Chan, T.; Guvanasen, V.; Littlestone, N. (Lawrence Berkeley Lab., CA (USA)). Mar 1981. Contract AC03-76SF00098. 54p. (SAC—33). NTIS, PC A04/MF A01. Order Number DE83014919.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Finite element analyses were carried out to assess the possible effects of the Stripa mine openings on the in-situ stress measured in a 400-m-deep borehole drilled from the surface. For this assessment, four 2-dimensional cases were modeled. These cases variously included two horizontal sections, and two separate, idealized vertical sections. An iron ore body in the mine was assumed to be completely extracted, thereby providing conservative estimates of stress concentration effects. Since no in-situ stress measurements were made before mining, overburden weight and horizontal stresses measured by hyrodfracturing were assumed to be the pre-mining state of stress. The stress state resulting from excavation of the mine was calculated by the finite element model. In the cases using horizontal sections, the model predicted a stress concentration factor at the borehole of approximately 1.15, which is negligible considering the difficulty of obtaining accurate stress measurements. For the vertical sections the model predicted higher stress concentration factors at depths less than 200 m. This was expected because the vertical sections chosen brought the borehole unrealistically close to the mine openings, thereby leading to overly conservative estimates. In general, deviations in the magnitudes and orientations of the calculated redistributed principal stresses from the assumed pre-mining state of stress were found to be comparable to the scatter of overcoring data. It is, therefore, recommended that, for near-field stress calculations, the vertical stress due to overburden weight and the horizontal stresses measured by hydrofracturing at the borehole be considered the unperturbed far-field in situ state of stress.

43362 (LBL—12574) Water inflow into boreholes during the Stripa heater experiments. Nelson, P.H.; Rachiele, R.; Remer, J.S.; Carlsson, H. (Lawrence Berkeley Lab., CA (USA); Svensk Kaernbraenslefoersoerjning AB, Stockholm). Apr 1981. Contract AC03-76SF00098. 108p. (SAC—35). NTIS, PC A06/MF A01. Order Number DE83015722.

During the operation of three in-situ heater experiments at Stripa, Sweden, groundwater flowed into many of the instrumentation and heater boreholes. These flows were recovered and measured routinely. The records of water inflow indicate two origins: inflow attributed to local hydrological pressure gradients, and water migration from cracks closing under the rapidly increasing, thermal-induced stress changes. The latter component appeared as a main pulse that occurred when the heaters were turned on, and lasted about 30 to 40 days, steadily declining over the next several months, and decreasing sharply when heater power was decreased or stopped. The magnitude of the total inflow per hole ranged over more than five decades, from 0.1 to over 10,000 liters over the 500 to 600 day time periods. When plotted against the logarithm of total volume, the frequency distribution displays a normal curve dependence with a mean of approximately 10 liters. Of this amount, 1 to 2 liters of flow into 38-mm-diam boreholes accompanied an increase in applied heat load. These amounts are compatible with rock porosities of a fraction of one percent. Inflow into the 3.6 and 5.0 kW heater holes peaked within 3 to 6 days after heater turn on, then declined to zero inflow, with no further inflow measured for the remainder of the experiments. In the heater holes of the time-scaled experiment, which operated at 1.125 kW or less, the initial pulse of inflow took much longer to decay, and 7 of 8 heater holes continued to flow throughout the experiment. The packing off and isolation of a borehole some 40 m distant in the ventilation drift dramatically increased the inflow into the heater holes in one of the three heater experiments. This demonstrated the existence of permeable flow paths among a number of boreholes. The records of water inflow demonstrate the need for a thorough understanding of the nature of fluid flow and storage in fractured crystalline rock.

43363 (LBL—14202) Determination of the state of stress at the Stripa Mine, Sweden. Doe, T.W.; Hustrulid, W.A.; Leijon, B.; Ingvald, K.; Strindell, L. (Lawrence Berkeley Lab., CA (USA); Colorado School of Mines, Golden (USA); Luleaa Univ., (Sweden); Statens Vattenfallsverk, Vaellingby (Sweden)). Mar 1982. Contract AC03-76SF00098. 13p. (CONF-811240—3). NTIS, PC A02/MF A01. Order Number DE83014864.

From Workshop on hydraulic fracturing stress measurements; Monterey, CA, USA (1 Dec 1981).

Portions are illegible in microfiche products.

The state of stress at the Stripa Mine has been measured both in a 381-m-deep hole drilled from the surface and in holes drilled from the drifts underground. Hydraulic fracturing and several overcoring methods have been used (Lulea triaxial gauge, CSIRO gauge, USBM gauge, Swedish State Power Board deep-hole Leeman triaxial gauge). Propagation of the hydraulic fractures underground was monitored acoustically in an attempt to determine the location and orientation of the fractures. The results of overcoring and hydraulic fracturing agree well, particularly for the magnitude and orientation of the greatest stress. The hydraulic-fracturing data were interpreted using first-breakdown pressures and tensile-strength values determined using statistical fracture mechanics. Shut-in pressure values were obtained from semi-logarithmic plots of the post-breakdown pressure decay and from reopening the fractures at low pumping rates.

43364 (ND-R—658(S)) Denitration of simulated fast reactor highly active liquor waste. Saum, C.J.; Ford, L.H.; Platts, N. (UKAEA Risley Nuclear Power Development Establishment). Nov 1981. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702200.

Vitrification of the highly active arisings from PFR fuel reprocessing is proposed as the optimum long-term solution to the disposal problem. During vitrification ruthenium volatilizes as the tetroxide. Evidence is presented which indicates that a substantial reduction in volatility can be effected by denitration of the liquid feed by treatment with formic acid. The kinetics and stoichiometry of the reactions involved in denitration are examined and empirical rate equations developed. The predictions of the empirical rate equation have been confirmed using a one-tenth scale continuous denitrator, thus giving confidence for the design of full-scale units.

43365 (NUREG/BR—0025-Vol.9-No.5) Information report on state legislation. Landau, M. (Nuclear Regulatory Commission, Washington, DC (USA). Office of State Programs). Jun 1983. 11p. NTIS, PC A02/MF A01 - GPO. Order Number DE83902262.

Legislation that would consent to the Central Interstate Low-Level Radioactive Waste Compact has been introduced into Congress as H.R. 3002. Similar legislation is expected to be introduced into the Senate soon. This is the second compact consent legislation to be introduced into Congress this year - the first was the Northwest Compact, introduced in January. States in the Central Compact are AR, KS, LA, NE and OK. Enacted and introduced radioactive waste management legislation in various states is summarized.

43366 (NUREG/CR—2938) Tailings treatment techniques for uranium mill waste: a review of existing information. Sherwood, D.R.; Serne, R.J. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 81p. (PNL—4453). NTIS, PC A05/MF A01 - GPO $4.50. Order Number DE83015038.

Of primary concern at uranium mill sites in the United States is the potential of ground-water contamination from mill wastes that are disposed in tailings impoundments. Although many systems have been used to control seepage from tailings impoundments, most of these systems are limited in their ability to handle an excess of tailings solution. Three general amelioration methods were identified: neutralization, fixation and specific constituent removal. During neutralization, a reagent is added to the tailings solution to neutralize the acidity and raise the pH to reduce the solubility of various pH sensitive contaminants. Fixation processes add materials such as lime, cement or asphalt to the waste to produce a physical-

ly stable composition that resists leaching of hazardous constituents. Specific constituent removal encompasses varying techniques, such as alternate ore leaching processes, effluent treatment with sorption, or ion exchange agents or selected precipitation that reduce specific constituent concentrations in tailings solution. Neutralization processes appear to be best suited for treating uranium mill tailings because they can, at a reasonable cost, limit the solution concentration of many contaminants. The effectiveness of the process depends on the reagent used as well as the waste being treated. Of the six reagents studied (lime, limestone, caustic soda, soda ash, combined limestone/lime and combined alumina/lime/soda), a combined treatment of limestone and lime seems best, especially for tailings containing ferric iron as the limestone economically buffers the solution acidity while the lime takes the pH to 8.0, an optimum level for heavy metal removal. For those tailings containing ferrous iron, lime alone works best. The costs for the lime/limestone or lime processes range from $0.20 to $1.00 per 1000 gal of treated water, excluding capital equipment costs.

43367 **(ONWI—242) Brine migration test for Asse Mine, Federal Republic of Germany: final test plan.** (Westinghouse Electric Corp., Pittsburgh, PA (USA)). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 249p. NTIS, PC A11/MF A01. Order Number DE83015314.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The United States and the Federal Republic of Germany (FRG) will conduct a brine migration test in the Asse Salt Mine in the FRG as part of the US/FRG Cooperative Radioactive Waste Management Agreement. Two sets of two tests each will be conducted to study both liquid inclusion migration and vapor migration in the two salt types chosen for the experiments: (1) pure salt, for its characteristics similar to the salt that might occur in potential US repositories, and (2) transitional salt, for its similarity to the salt that might occur in potential repositories in Germany.

43368 **(ONWI—390) Exploratory shaft conceptual design report: Paradox Basin.** (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 90p. NTIS, PC A05/MF A01. Order Number DE83015359.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This conceptual design report summarizes the conceptualized design for an exploratory shaft facility at a representative site in the Paradox Basin located in the southeastern part of Utah. Conceptualized designs for other possible locations (Permian Basin in Texas and Gulf Interior Region salt domes in Louisiana and Mississippi) are summarized in separate reports. The purpose of the exploratory shaft facility is to provide access to the reference repository horizon to permit in situ testing of the salt. The in-situ testing is necessary to verify repository salt design parameters, evaluate isotropy and homogeneity of the salt, and provide a demonstration of the constructability and confirmation of the design to gain access to the repository. The fundamental purpose of this conceptual design report is to assure the feasibility of the exploratory shaft project and to develop a reliable cost estimate and realistic schedule. Because a site has not been selected and site-specific subsurface data are not available, it has been necessary to make certain assumptions in order to develop a conceptual design for an exploratory shaft facility in salt. As more definitive information becomes available to support the design process, adjustments in the projected schedule and estimated costs will be required.

43369 **(ONWI—391) Exploratory shaft conceptual design report: Gulf Interior Region salt domes.** (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 106p. NTIS, PC A06/MF A01. Order Number DE83015917.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This conceptual design report summarizes the conceptualized design for an exploratory shaft facility at a representative site in the Gulf Interior Region of the United States (Louisiana and Mississippi). Conceptualized designs for other possible locations (Paradox Basin in Utah and Permian Basin in Texas) are summarized in separate reports. The purpose of the exploratory shaft facility is to provide access to the reference repository horizon to permit in-situ testing of the salt. The in-situ testing is necessary to verify repository salt design parameters, evaluate isotropy and homogeneity of the salt, and provide a demonstration of the constructability and confirmation of the design to gain access to the repository. The fundamental purpose of this conceptual design report is to assure the feasibility of the exploratory shaft project and to develop a reliable cost estimate and realistic schedule. Because a site has not been selected and site-specific subsurface data are not available, it has been necessary to make certain assumptions in order to develop a conceptual design for an exploratory shaft facility in salt. As more definitive information becomes available to support the design process, adjustments in the projected schedule and estimated costs will be required.

43370 **(ONWI—392) Exploratory shaft conceptual design report: Permian Basin.** (Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 92p. NTIS, PC A05/MF A01. Order Number DE83015918.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This conceptual design report summarizes the conceptualized design for an exploratory shaft facility at a representative site in the Permian Basin locatd in the western part of Texas. Conceptualized designs for other possible locations (Paradox Basin in Utah and Gulf Interior Region salt domes in Louisiana and Mississippi) are summarized in separate reports. The purpose of the exploratory shaft facility is to provide access to the reference repository horizon to permit in situ testing of the salt. The in situ testing is necessary to verify repository salt design parameters, evaluate isotropy and homogeneity of the salt, and provide a demonstration of the constructability and confirmation of the design to gain access to the repository. The fundamental purpose of this conceptual design report is to assure the feasibility of the exploratory shaft project and to develop a reliable cost estimate and realistic schedule. Because a site has not been selected and site-specific subsurface data are not available, it has been necessary to make certain assumptions in order to develop a conceptual design for an exploratory shaft facility in salt. As more definitive information becomes available to support the design process, adjustments in the projected schedule and estimated costs will be required.

43371 **(ONWI—467-Vol.1) Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume I.** Kolb, C.R.; Holmes, J.C.; Alford, J.J. (Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 183p. NTIS, PC A09/MF A01. Order Number DE83015362.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Three mappable Quaternary terrace surfaces overlie Vacherie dome. The upper level tentatively equated with the Montgomery terrace, is estimated to be from 300,000 to 500,000 years in age. The middle level, assigned to the Prairie terrace, 70,000 to 125,000 years in age; and the lowest level, to the Deweyville, from 18,000 to 30,000 years in age. Studies show no indication of upwarping of any level by instability of the salt column. Quaternary levels over the central portion of the dome show some evidence of having been displaced downward by dissolution and subsidence of the underlying salt/caprock. Hydrologic instability of the dome during Quaternary time is suggested by abnormal thickening of the Quaternary over the western portion of the dome and possibly at the constricted mouth of Bashaway Creek valley. The maximum amount of erosion that can be anticipated at Vacherie dome during the next 250,000 years is 150 ft.

43372 **(ONWI—467-Vol.2) Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume II.** Kolb, C.R.; Holmes, J.C.; Alford, J.J. (Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies). Jul 1983. Contract AC06-76RL01830;AC02-83CH10140. 270p. NTIS, PC A12/MF A01. Order Number DE83015361.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This volume comprises 14 appendices: lineations on Vacherie and Rayburn's domes (1977); possible geomorphic influence of Vacherie salt dome on the Quaternary fluvial geomorphology of Bashaway Creek (1980); remote sensing and analysis of radar imagery (1978); uphole seismic survey at Vacherie salt dome (1977); electrical resistivity survey at Vacherie salt dome (1978); pedologic investigations (1977); ionium-thorium dating of ironstones from terrace deposits, Vacherie salt dome, North Louisiana (1978); grain-shape and grain-surface studies (1981); the terrace concept - Gulf Coastal Plain (1981); interpretation of Quaternary sediments along lines of seismic shot hole (1976); topographic lows above domes (1977); structural significance of topographic lows above North Louisiana salt domes (1981); diagnostic microfossils - Vacherie dome (1978); and development of stratigraphy above Vacherie dome from Cretaceous to Sparta times (1982).

43373 **(ONWI—481) Preliminary overburden characterization at Richton Dome.** (ERTEC, Inc., Long Beach, CA (USA)). Jun 1983. Contract AC06-76RL01830;AC02-83CH10140. 74p. NTIS, PC A04/MF A01. Order Number DE83015175.

The Richton Dome overburden (earth materials overlying the salt stock and caprock) was characterized by geotechnical and hydrologic data analysis. The physical condition was described to facilitate a conceptual Exploratory Shaft (ES) design study. The analysis was based on existing data generated for other site selection purposes. Data sets were reorganized and evaluated to address the needs of an Exploratory Shaft conceptual design study. General index properties were developed from geophysical logs and lithologic sample descriptions. These properties included bulk density, porosity, shear strength, elasticity, permeability, and saturation. Additionally, chemical and thermal properties were developed and the local hydrology addressed. Lithologic material groupings were made possible by similarities in physical properties and makeup. Described subsurface conditions exposed to unique excavation problems but require verification through additional investigation. Future work should focus on shaft wall stability, ground-water inflow, expansive clays, and the impacts of long-term materials exposure to the atmosphere.

43374 **(ORNL/TM—8798) Characterization of hydrofracture grouts for radionuclide migration.** Stinton, D.P.; McDaniel, E.W.; Weeren, H.O. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 16p. NTIS, PC A02/MF A01. Order Number DE83015754.

Hydrofracture grouts were characterized by optical microscopy, scanning electron microscopy, x-ray diffraction, and β-γ autoradiography. We examined laboratory-produced samples containing simulated wastes as well as actual radioactive samples of hydrofracture grout sheets obtained by core drilling. X-ray diffraction results revealed that both laboratory-produced samples and a core-drilled sample consisted primarily of calcium carbonate phases. Both sample types contained very small amounts of waste strontium or cesium, neither of which could be detected microscopically. Autoradiography revealed that ^{90}Sr, ^{137}Cs, and ^{60}Co were still present in the core-drilled 20-year-old grout and that they had not migrated into the trapped shale fragments.

43375 **(PNL—4488) Thermal release of volatile fission products from irradiated nuclear fuel.** Bray, L.A.; Burger, L.L.; Morgan, L.G.; Baldwin, D.L. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76RL01830. 74p. NTIS, PC A04/MF A01. Order Number DE83014906.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An effective procedure for removing ^{3}H, Xe and Kr from irradiated fuels was demonstrated using Shippingport UO_2 fuel. The release characteristics of ^{3}H, Kr, Xe, and I from irradiated nuclear fuel have been determined as a function of temperature and gaseous environment. Vacuum outgassing and a flowing gas stream have been used to vary the gaseous environment. Vacuum outgassing released about 99% of the ^{3}H and 20% of both Kr and Xe within a 3 h at 1500°C. Similar results were obtained using a carrier gas of He containing 6% H_2. However, a carrier gas containing only He resulted in the release of approximately 80% of the ^{3}H and 99% of both Kr and Xe. These results indicate that the release of these volatile fission products from irradiated nuclear fuel is a function of the chemical composition of the gaseous environment. The rate of tritium release increased with increasing temperature (1100 to 1500°C) and with the addition of hydrogen to the gas stream. Using crushed UO_2 fuel without cladding and He as the carrier gas, Kr was completely released at 1500°C in 2.5 h. Below 1350°C, no Kr-Xe release was observed. Approximately 86% of the ^{129}I and 95% of the cesium was released from a piece (3.9 g) of UO_2 fuel at 1500°C in He. The zirconium cladding was observed to fracture during heat treatment. A large-scale thermal outgassing system was conceptually designed by the General Atomic Company from an engineering analysis of available experimental data. The direct cost of a 0.5 metric/ton day thermal outgassing system is estimated to be $1,926,000 (1982 dollars), including equipment, installation, instrumentation and controls, piping, and services. The thermal outgassing process was determined to be a technically feasible and cost-competitive process to remove tritium in the head-end portion of a LWR fuel reprocessing plant. Additional laboratory-scale development has been recommended.

43376 **(PNL-SA—7279) New decontamination techniques for exposure reduction.** Arrowsmith, H.W.; Allen, R.P. (Pacific Northwest Lab., Richland, WA (USA)). 1978. Contract AC06-76RL01830. 25p. (CONF-781109—31). NTIS, PC A02/MF A01. Order Number DE83014874.

From Environmental control symposium; Washington, DC, USA (28 Nov 1978).

Portions are illegible in microfiche products.

This paper summarized work sponsored by the US Department of Energy to develop electropolishing, vibratory finishing, and liquid honing techniques into an integrated decontamination system capable of processing the large volumes of metallic waste that will be generated by the decommissioning of nuclear facilities. There are significant differences in the minimum contamination level that can be attained with each technique. Electropolishing is the only method that can consistently reduce surface contamination levels to background. As a general comparison, decontamination factors $>$ 100,000 are reasonable for electropolishing, $>$ 2000 for liquid honing, and $>$ 200 for vibratory finishing. Another important difference in the three decontamination techniques is the relative ease of maintaining a low background contamination level in the decontamination system. The unique properties of the phosphoric acid electrolyte facilitate containment of the contamination removed by the electropolishing process. Similarly, the contamination removed by vibratory finishing is continuously washed out of the vibrating bed and collected in the sludge tank. In the case of the liquid honer, however, the blast system tends to disperse the contamination. Thus, although the liquid honer is very useful for the rapid decontamination of small parts, it would require a well-engineered containment system and a high degree of operator care for routine, high-volume decontamination application.

43377 **(RFP—3357) Characteristics of transuranic waste at Department of Energy sites.** Jensen, R.T.; Wilkinson, F.J. III. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). May 1983. Contract AC04-76DP03533. 160p. NTIS, PC A08/MF A01. Order Number DE83015674.

Portions are illegible in microfiche products.

This document reports data and information on TRU waste from all DOE generating and storage sites. The geographical location of the sites is shown graphically. There are four major sections in this document. The first three cover the TRU waste groups known as Newly Generated, Stored, and Buried Wastes. Subsections are included under Newly Generated and Stored on contact-handled and remote-handled waste. These classifications of waste are defined, and the current or expected totals of each are given. Figure 1.3 shows the total amount of Buried and Stored TRU waste. Preparation of this document began in 1981, and most of the data are as of December 31, 1980. In a few cases data were reported to December 31, 1981, and these have been noted. The projections in the Newly Generated section were made, for the most part, at the end of 1981.

43378 **(RHO-BW-SA—271P) Performance allocation traceable to regulatory criteria as applied to site-characterization work at the Basalt Waste Isolation Project.** Deju, R.A.; Babad, H.; Jacobs, G.K.; Bensky, M.S. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Feb 1983. Contract AC06-77RL01030. 9p. (CONF-830205—32). NTIS MF A01. Order Number DE83015079.

From Waste management conference; Tucson, AZ, USA (27 Feb 1983).

Microfiche only, copy does not permit paper copy reproduction.

The Basalt Waste Isolation Project has developed a method for defining in detail the work required to demonstrate the feasibility of emplacing and providing for the safe isolation of nuclear wastes in a repository in the deep basalts at the Hanford Site near Richland, Washington. Criteria analysis allows the identificiation of areas of significant technical uncertainty or controversy that can be highlighted as issues. A preliminary analysis has been conducted, which, by identifying key radionuclides and allocating performance among the multiple barriers in a repository constructed in a basalt, allows the design and development testing activities at the Basalt Waste Isolation Project to be put into perspective. Application of sophisticated uncertainty analysis techniques will allow refinements in the analysis to be made and to further guide characterization and testing activities. Preliminary results suggest that a repository constructed in basalt will provide for the safe isolation of nuclear wastes in a cost-effective and reliable manner with a high degree of confidence.

43379 **(RHO-BWI-LD—29) Drilling history of core hole DB-15.** Diediker, L.D.; Ledgerwood, R.K. (Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations). Sep 1980. Contract AC06-77RL01030. 50p. NTIS MF A01. Order Number DE83015563.

Microfiche only, copy does not permit paper copy reproduction.

This core hole was drilled to obtain hydrologic and chemical data on the permeable zones of the Saddle Mountains and Wanapum Formations. These data were obtained by testing the zones that were penetrated during drilling. This testing-as-drilled method reduced the potential problems of interflow and water contamination. This report summarizes the drilling and coring operations; geologic logging, hydrologic testing, and geophysical logging activities; and cementing operations of DB-15 during drilling. The successful completion of DB-15 demonstrated that hydrologic testing can be conducted during core drilling operations. More reliable head measurements and uncontaminated representative water samples from isolated permeable zones, which have not been exposed to potential open borehole cross-flow and head equilibration problems, were benefits derived from the testing-as-drilled method. Disadvantages of the technique were a longer time to complete the borehole caused by time required for testing and increased drilling costs due to rig standby time during testing. Extension of the testing-as-drilled method to the drilling of future core holes is recommended. An evaluation should be made of the required hydrologic data and expected borehole stratigraphy before and during drilling to allow uninterrupted drilling in zones of low permeability that can be tested after drilling is complete.

43380 **(SAND—80-0202) Subseabed Disposal Program In-Situ Heat Transfer Experiment (ISHTE).** Percival, C.M. (ed.). (Sandia National Labs., Albuquerque, NM (USA)). May 1983. Contract AC04-76DP00789. 46p. NTIS, PC A03/MF A01. Order Number DE83014466.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A heat transfer experiment is being developed in support of the Subseabed Disposal Program. The primary objectives of this experiment are: to provide information on the in situ response of seabed sediment to localized heating; to provide an opportunity to evaluate theoretical models of the response and to observe any unanticipated phenomena which may occur; and to develop and demonstrate the technology necessary to perform waste isolation oriented experiments on the seafloor at depths up to 6000 m. As presently envisaged, the heat transfer experiment will be conducted at a location in the central North Pacific though it could be performed anywhere that the ocean bottom is of the type deemed suitable for the disposal of nuclear waste material. The experiment will be conducted of the seafloor from a recoverable space-frame platform at a depth of approximately 6000 m. A 400-W isotopic heat source will be implanted in the illite sediment and the subsequent response of the sediment to the induced thermal field evaluated. After remote initiation of the experiment, a permanent record of the data obtained will be recorded on board the platform, with selected information transmitted to a surface vessel by acoustic telemetry. The experiment will be operational for one year, after which the entire platform will be recovered. Current plans call for the deployment of the experiment in 1986. Specific activities which will be pursued during the course of the experiment include: measurement of the thermal field; determination of the effective thermal conductivity of the sediment; measurement of pore pressure; evaluation of radionuclide migration processes; pore water sampling; sediment chemistry studies; sediment shear strength measurements; and coring operations in the immediate vicinity of the experiment for postexperiment analysis.

43381 **(SAND—81-1405C) Microstructural characterization of simulated reactor waste forms.** Whan, R.E. (Sandia National Labs., Albuquerque, NM (USA)). 1981. Contract AC04-76DP00789. 8p. (CONF-811025—3). NTIS, PC A02/MF A01. Order Number DE81030709.

From 25. conference on analytical chemistry and nuclear technology; Gatlinburg, TN, USA (6 Oct 1981).

Several types of simulated nuclear waste forms have been characterized to obtain detailed information about phase distributions, stoichiometries, and crystal structures. This information can be used to explain or predict other properties such as leachability and volatility. In addition, high resolution transmission electron microscopy has been used to study internal radiation damage in metamict minerals which are natural analogs to certain phases in the waste forms. 4 figures.

43382 **(SAND—81-7206) Forced ventilation analysis of a commercial high-level nuclear waste repository in tuff. Topical report RSI-0175.** Svalstad, D.K.; Brandshaug, T. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 129p. NTIS, PC A07/MF A01. Order Number DE83014855.

Portions are illegible in microfiche products.

This report addresses the feasibility of using blast cooling for rapid drift and formation cooling prior to a nuclear waste retrieval operation. A coupled conduction/convection analysis is used to examine the various parameters and conditions which control the blast cooling process for the purpose of assessing their relative significance and potential impact on developing a blast cooling scenario for a nuclear waste repository in tuff. Formation stability is addressed briefly with regard to the potential for thermal spalling induced by the rapid cooling of the heated repository walls.

43383 **(SAND—82-0525) Stresses near waste canisters buried in salt.** Canfield, T.R. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1983. Contract AC04-76DP00789. 36p. NTIS, PC A03/MF A01. Order Number DE83014793.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Near field stresses and displacements were estimated for a heated canister buried in a natural salt formation. The results could be used to estimate hole closure and brine migration near the canister. In the event of hole closure, contact stress could be bracketed by calculation extremes.

43384 **(SAND—82-2980) Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms.** Dosch, R.G.; Headley, T.J.; Northrup, C.J.; Hlava, P.F. (Sandia National Labs., Albuquerque, NM (USA)). May 1983. Contract AC04-76DP00789. 82p. NTIS, PC A05/MF A01. Order Number DE83015637.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A process leading to titanate-based waste forms for commercial high-level nuclear waste is described. Radionuclides are fixed

on hydrous calcium titanate by ion exchange/sorption reactions and the material is converted to a dense, ceramic form by hot pressing. Transmission electron microscopy-electron microprobe characterization was done to determine the effects of compositional changes and process variations on microstructure. Leaching studies in the range of 22 to 150°C and pH 2 to 12 were done to assess the effects of the same variables on leaching behavior. Samples of a reference borosilicate glass waste form were leached under the same conditions to provide a direct comparison between the two waste forms. Lead-ion implantation was used to simulate long-term α-recoil damage in the crystalline titanate phases. Comparison of α-recoil damage in natural minerals with damage induced in synthesized samples of the same mineral suggest that Pb-ion implantation is a valid technique for simulating α-recoil effects. All the titanate phases sustained significant lattice damage at equivalent α-doses of $1 \times 10^{16}/cm^3$; however, Rutherford backscattering and transmission electron microscopy studies showed that the damage did not result in significant matrix dissolution in these leaching tests.

43385 **(SAND—83-0166) Petrographic study of evaporite deformation near the Waste Isolation Pilot Plant (WIPP).** Borns, D.J. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 51p. NTIS, PC A04/MF A01. Order Number DE83014796.

The Delaware Basin of southeastern New Mexico contains about 1000 m of layered evaporites. Areas in the northern Delaware Basin, bordering the Capitan reef, have anomalous seismic reflection characteristics, such as loss in reflector continuity. Core from holes within this zone exhibits complex mesoscopic folds and extension structures. On a larger scale, anticlines and synclines are indicated by structure contours based on boreholes. The deformation is probably gravity-driven. Such a process is initiated by basin tilting during either a Mesozoic or Cenozoic period of uplift. Small-scale structures suggest that deformation was episodic with an early, syndepositional stage of isoclinal folding. Later, open-to-tight asymmetric folding is more penetrative and exhibits a sense of asymmetry opposite to that of the earlier isoclinal folding. The younger folds are associated with development of zonal crenulation cleavage and microboundinage of more competent carbonate layers. At the same time, halite beds developed dimensional fabrics and convolute folds in anhydrite stringers. Late-stage, near-vertical fractures formed in competent anhydrite layers. Microscopic textures exhibit rotated anhydrite porphyroblasts, stress shadow growth, and microboundinage. Except during late-stage deformation, anhydrite and halite recrystallized synkinematically. Drastic strength reduction in anhydrites through dynamic recrystallization occurs experimentally near 200°C. However, evaporites of the WIPP site never experienced temperatures > 40°C. Microscopic fabrics and P, T history of the evaporites suggest that pressure solution was the active mechanism during deformation of evaporites at the WIPP site.

43386 **(SAND—83-0280) Hydrology of sealing a repository in saturated tuff.** Mondy, L.A. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1983. Contract AC04-76DP00789. 66p. NTIS, PC A04/MF A01. Order Number DE83015633.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

In the hydrologic modeling studies it was assumed that the repositories were located in volcanic tuff such as is found in Yucca Mountain at the Nevada Test Site. This modeling study dealt only with repositories in saturated rock and investigated the effects on groundwater flow once drifts and shafts are filled with materials of various permeability. Temperature effects were not examined. Modeling was limited to two dimensions, necessitating simplifying assumptions in some cases. Groundwater flow for the drift model was assumed to be due primarily to a hydraulic head gradient caused by a dipping water table similar to that found in the Yucca Mountain region. In the shaft model a vertical pressure gradient was assumed so that comparisons of sealing designs could be made. Results indicated that observable deviations in the groundwater flow near a repository would occur unless the drifts and shafts were backfilled to a permeability approaching that of the native rock. A series of low permeability blocks in the drifts showed promise in reducing these deviations in groundwater flow, as long as the spacing between blocks remained relatively short (<10 m). Sealing only the intersections of drifts proved ineffective. The preferred orientation for the repository appeared to be one with the emplacement drifts perpendicular to the dominant flow direction. This orientation allowed less water to flow past the waste, and the access drifts could be used to provide a path of least resistance to draw more water away from the emplacement drifts. The most effective measure to prevent large flow rates through vertical shafts was to backfill the shaft to a permeability approaching that of the undisturbed rock. Bulkheads placed in the shaft had little influence on the flow. The effects of a highly permeable disturbed zone 1.37 m in thickness produced by drilling the shaft were also studied.

43387 **National waste terminal storage program: progress and status.** Carbiener, W.A. (Office of NWTS Integration Battelle Project, Management Division, 505 King Avenue, Columbus, Ohio 43201). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **30**: No. 1, 551-555(Feb 1983).

The progress and status of the National Waste Terminal Storage Program (NWTS) is discussed. Ongoing site characterization activities are described along with waste package and repository design development efforts. Overall systems and licensing work is reviewed. These activities are set in the context of program objectives and scope, strategy implementation, and the technical and institutional impacts of pending waste management legislation, regulatory activities, and NEPA compliance.

43388 **Geotechnical instrumentation requirements for at-depth testing and repository monitoring in tuff.** Zimmerman, R.M. (Sandia National Laboratories, Albuquerque, New Mexico). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **30**: No. 1, 556-560(Feb 1983).

This paper outlines geotechnical instrumentation requirements for the possible establishment of a nuclear waste repository in tuff on the Nevada Test Site (NTS). The Nuclear Regulatory Commission (NRC) has specified a continuing program to confirm performance during the operational period of the repository, which could last 50 years. Minimum required geotechnical measurements for confirmation of performance include thermal and thermomechanical responses; changes in stress, strain, and displacements; and pore pressure and groundwater flow characteristics. Conditions expected in tuff are: maximum rock temperatures of less than 250°C, stresses less than 100 MPa, strains between + or -0.01 mm/mm, and pore pressures less than 35 KPa in the unsaturated zone where hydraulic head is not the primary contributor. The paper describes instrumentation needed to make the desired measurements. In general, the instrumentation and data system are required to be stable and reliable for tens of years. Designs must consider requirements for temperature stability, temperature expansion compensation, moisture resistance, and long-term durability in mining-type environments. Severe requirements such as these suggest consideration of techniques for in-situ replacement of instrumentation. State-of-the-art instrumentation is briefly described along with a discussion of needs for refinement, replacement/recalibration and instrumentation development.

43389 **Results of instrument reliability study for high-level nuclear waste repositories.** Rogue, F.; Binnall, E.P. (Lawrence Livermore National Laboratory, P. O. Box 808, Livermore, CA 94550). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **30**: No. 1, 565-570(Feb 1983).

Reliable instrumentation will be needed to monitor the performance of future high-level waste repository sites. A study has been made to assess instrument reliability at Department of Energy (DOE) waste repository related experiments. Though the study covers a wide variety of instrumentation, this paper concentrates on experiences with geotechnical instrumentation in hostile repository-type environments. Manufacturers have made some changes to improve the reliability of instruments for repositories. In this paper, the authors review the failure modes, rates, and mechanisms, along with manufacturer modifications and recommendations for additional improvements to enhance instrument performance.

43390 **Biobarriers used in shallow burial ground stabilization.** Cline, J.F.; Burton, F.G.; Cataldo, D.A.; Skiens, W.E. (Pacific Northwest Laboratory, P.O. Box 999, Richland, Washington 99352). *Nuclear Technology;* **58**: No. 2, 150-153(Aug 1982).

Three types of barriers to plant root growth were investigated. Previously, a long-term barrier was created by placing loose rock between buried waste and topsoil; this barrier successfully prevented plant root and animal intrusions into buried waste. Then an intermediate-term barrier was made by encapsulating phytotoxin into a polymer. The polymer regulated phytotoxin release and also acted to prolong the toxin's effectiveness. A short-term barrier was made by spraying phytotoxin directly onto a thin layer of soil between the waste and topsoil. Trifluralin proved to be the most effective of seven phytotoxins studied because it prevented root penetration of the barrier. Trifluralin is not translocatable and allows nonaffected plant parts to grow normally.

43391 **Generation and vitrification of high-level light water reactor liquid waste.** Wheelwright, E.J.; Bjorklund, W.J.; Browne, L.M.; Bryan, G.H.; Holton, L.K.; Irish, E.R.; Siemens, D.H. (Pacific Northwest Laboratory, P.O. Box 999, Washington 99352). *Nuclear Technology;* **58**: No. 2, 271-293(Aug 1982).

The Nuclear Waste Vitrification Project was conducted to demonstrate the vitrification of high-level liquid waste (HLLW) generated during the reprocessing of spent fuel discharged from an operating light water reactor. Six pressurized water reactor fuel assemblies, containing 2.3 tU, were processed for the generation at HLLW. A conventional Purex-type process was used for the first cycle so that the HLLW generated would be typical of the nitric acid, fission product waste stream from the first extraction cycle of a commercial plant. Uranium and nonradioactive chemicals, normally added to the HLLW by back-cycling of waste from second and third solvent-extraction cycles, were added to the dilute HLLW to produce a waste composition typical of the HLLW from a commercial plant. The waste was then concentrated tenfold to provide feed for solidification by the spray calciner/in-can melting process. During calcination, the liquid waste was pumped to the calciner vessel, which was heated to 750°C. The powdered calcine fell into a stainless steel canister, which was maintained at 1050°C; this canister was attached directly to the bottom of the calciner. Glass-forming chemicals were metered into the canister simultaneously with the calcine. After the materials melted, the canister was cooled to produce glass. Two canisters containing glass were produced.

43392 **Analytical models for thermal rock mechanics.** Hodgkinson, D. Harwell, England; UKAEA Atomic Energy Research Establishment (1982). 121p. (AERE-R—10341). H.M. Stationery Office, Price Pound 6.00.

Analytically soluble models are used to examine the consequences of burying a large heat source in hard rock, and in particular the thermal effects of high-level radioactive waste disposal. Models for the temperature, thermal stress and thermal convection of groundwater around buried heat sources are derived and discussed. In each case only the simplest physical models are considered namely heat conduction, linear thermo-elasticity and Darcy flow respectively. Elementary introductions are given to these topics and they are illustrated by a variety of simple analytical models. Finally, models that have been specially developed to assess the thermal impact of buried radioactive waste on its surroundings are described and discussed.

0530 Environmental Aspects

REFER ALSO TO CITATION(S) 43347, 43348, 43366, 43374, 44700, 44701, 44711, 44712

43393 **(CONF-830375—1) Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides.** Vandegrift, G.F.; Bowers, D.L.; Gerding, T.J.; Fried, S.M.; Wilbur, C.K.; Seitz, M.G. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 19p. NTIS, PC A02/MF A01. Order Number DE83014348.

From Conference on geochemical behavior of disposed radioactive waste; Seattle, WA, USA (20 Mar 1983).

Experiments are being performed at Argonne National Laboratory (ANL): (1) to identify interactions of radionuclides and repository components that effect nuclide migration, and (2) to assess changes in nuclide migration caused by modifications expected upon aging of the waste, clay backfill, and rock. The experiments are conducted with radioactive borosilicate glass, bentonite and mechanically fissured basalt rock in flowing water analogous to their configuration in a breach of a nuclear waste repository. Changes undergone by the groundwater as it passed through the fissure include: (1) drop in pH from 10 to 8, (2) loss of suspended particulate, and (3) loss of dissolved/suspended U, Np, and Pu. These effects, also studied as functions of radiation dose and of laboratory aging of the repository components, are related to the predicted long-term performance of a nuclear waste repository.

43394 **(DOE/SR/00952—T9) Nuclear-fuel-cycle education: Module 10. Environmental consideration.** Wethington, J.A.; Razvi, J.; Grier, C.; Myrick, T. (International Atomic Energy Agency, Vienna (Austria); Florida Univ., Gainesville (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 183p. NTIS, PC A09/MF A01. Order Number DE83015543.

Portions are illegible in microfiche products.

This educational module is devoted to the environmental considerations of the nuclear fuel cycle. Eight chapters cover: National Environmental Policy Act; environmental impact statements; environmental survey of the uranium fuel cycle; the Barnwell Nuclear Fuel Reprocessing Plant; transport mechanisms; radiological hazards in uranium mining and milling operations; radiological hazards of uranium mill tailings; and the use of recycle plutonium in mixed oxide fuel.

43395 **(SRC-C—805-48-C-81) Problem of abandoned uranium tailings in northern Saskatchewan. An overview.** Swanson, S.; Abouguendia, Z. (Saskatchewan Research Council, Saskatoon (Canada)). Nov 1981. 108p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83701832.

Two Saskatchewan tailings sites, Lorado and Gunnar, covering approximately 89 ha., were abandoned in the early 1960s leaving untreated tailings in lakes and depressions. This report reviews the literature on environmental conditions in abandoned uranium tailings and available managmenet and mitigation options, and identifies research requirements essential for proper treatment of these two sites. The recommended management plan includes isolation of the exposed tailings area from surface waters, stabilization of the exposed tailings surfaces, diversion of runoff around tailings, treatment of overflow water before release, and implementation of an environmental monitoring program. Revegetation appears to be a promising stabilization measure, but research is needed into propagation methods of appropriate native species. Studies of the existing geological and hydrological conditions at both sites, detailed characterization of the wastes, field testing of different surface treatment methods, and nutrient cycling investigations are also needed.

43396 **Characterization of radionuclide behavior in low level waste sites.** Toste, A.P.; Abel, K.H.; Kirby, L.J.; Perkins, R.W.; Robertson, D.E. (Battelle, Pacific Northwest Laboratory, Richland, Washington 99352). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **30**: No. 1, 580-585(Feb 1983). Contract AC06-76RL01830.

This laboratory is investigating the subsurface migration of radionuclides in groundwater at the Maxey Flats, Kentucky, shallow land burial site and at a low-level aqueous waste disposal facility. At Maxey Flats, radionuclide and tracer data indicate groundwater communication between a waste trench and an adjacent experimental study area. Areal distributions of radionuclides in surface soil confirm that contamination at Maxey Flats has been largely contained on site. Of the radionuclides detected in the surface soil, only ^{3}H and ^{60}Co concentrations appear to be derived from waste. Plutonium exists in the anoxic subsurface waters at Maxey Flats as a reduced, anionic complex; some of the plutonium appears to be complexed with EDTA, whereas organic acids seem to be associated with ^{137}Cs and ^{90}Sr. At the aqueous waste disposal site,

^{3}H and mainly anionic species of certain radionuclides, including ^{60}Co, ^{106}Ru, ^{99}Tc, ^{131}I, and TRACES OF ^{238}Pu, ^{239}Pu and ^{240}Pu appear to migrate from a trench through soil adjacent to the trench. Radionuclides in the particulate and cationic forms appear to be efficiently retained by the soil. In general, observations indicate that the physicochemical form of the radionuclides mediates their subsurface migration in groundwater at both waste disposal sites.

43397 **Ecological characteristics of small mammals on a radioactive waste disposal area in southeastern Idaho.** Groves, C.R.; Keller, B.L. (Idaho State Univ., Pocatello). *American Midland Naturalist;* **109**: No. 2, 253-264(1983).

Species composition, diversity, biomass and densities of small mammal populations were examined in crested wheatgrass (Agropyron cristatum) and Russian thistle (Salsola kali) habitats on a solid radioactive waste disposal area and in native sagebrush (Artemisia tridentala) habitat surrounding the disposal area. The 15-month live-trapping study resulted in the marketing of 2384 individuals representing 10 species of small mammals. The deer mouse (Peromyscus maniculatus) was the most common rodent in both disposal area habitats and the adjacent sagebrush habitat; Ord's kangaroo rat (Dipodomys ordii) was also an abundant rodent in all vegetation types. The montane vole (Microtus montanus) was common only in crested wheatgrass stands on the disposal area. Although the adjacent native sagebrush habitat had the highest species diversity and the Russian thistle habitat on the disposal area had the lowest, the total rodent density was not significantly different among the three vegetation types. Crested wheatgrass within the disposal area contained the largest rodent biomass throughout the study, in part due to an increasing M. montanus population. The peak small mammal biomass of 5000 g/ha in creasted wheatgrass and sagebrush habitats was considerably higher than previously reported for similar habitats. Differences in diversity and biomass between the disposal area and surrounding native habitat are most likely related to differences in soil compaction and vegetation between these two areas.

43398 **Neptunium concentrations in solutions contacting actinide-doped glass.** Rai, D.; McVay, G.L.; Strickert, R.G. (Pacific Northwest Laboratory P.O. Box 999, Richland, Washington 99352). *Nuclear Technology;* **58**: No. 1, 69-76(Jul 1982).

To help predict concentrations of neptunium leached from nuclear waste repositories in geologic environments, the solubility of neptunium in a neptunium-doped borosilicate glass, which simulates a high-level waste glass, was investigated. The concentrations of neptunium in solutions contacting the crushed doped glass were found to be controlled by a neptunium solid phase that is similar to crystalline(c) NpO_2 in solubility. Thus, the maximum concentration of the neptunium leached from this waste form can be predicted from the solubility of NpO_2(c). This conclusion is based on similar neptunium concentrations in solutions contacting neptunium-doped glass, neptunium-doped glass plus NpO_2(c), and NpO_2(c) alone, under controlled redox potentials and a range of pH values. The quinhydrone used in this study was found to be a very effective redox buffer (the approximate pe + pH = 11.8). The predictions based on the thermodynamic data and the solvent extraction tests showed Np(V) to be the primary oxidation state in solution.

43399 **(ORNL-tr—4994) Data base for a site-specific analysis of the dispersion of radioactive elements from a final repository.** Hadermann, J. (Oak Ridge National Lab., TN (USA); Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)). [nd]. Contract W-7405-ENG-26. Translation of EIR Report No. 447, November 1981. 30p. NTIS, PC A03/MF A01. Order Number DE83015040.

Migration analysis is of considerable importance in long-term safety analysis of radioactive waste repositories. In a first step our plans are to calculate transport of radionuclides using data - as far as possible - for an undisturbed hydrogeology. Thereby a reference case is defined. In a later step, possible events and processes can be considered leading to a deviation from the reference case. The present work gives the data base for a selected part of a comprehensive geosphere transport calculation. We restrict ourselves to a critical evaluation of parameters pertinent to the migration analysis of the ^{248}Cm chain. This includes the important nuclide ^{237}Np. For the first time we are able to perform a site specific calculation for repositories planned in deep geologic formations in Switzerland. The well known fact that the data basis is extremely sparse is pointed out once more and concretized in detail.

0540 Health And Safety

REFER ALSO TO CITATION(S) 43334, 43335, 43336, 43348, 43356, 43394, 44697

43400 **(BMFT-FB-HA—83-005) Investigation of stress of man caused by work and climate in salt mining.** Luerig, H.J.; Thien, P. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Feb 1983. 142p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750905.

With 69 figs., 11 tabs., 59 refs.

To find out a relation between load caused by work and (mine) climate and the resulting stress of the employees under the conditions of the salt mining in Niedersachsen an underground field investigation was performed with 240 mineworkers. Besides the climatic elements dry-, wet-bulb temperature and air speed the heaviness of the work, the working sequence and the physiological magnitudes heart-beat rate and body temperature were included with respect to the physical efficiency of the patients. The dry-bulb temperature varied between 9 and about 50°C and the relative humidities between 5 and 20%, very strong varying air velocity and radiation temperatures equal to the dry-bulb temperature. The transformation of energy which characterizes the heaviness of work for the single activities mainly lay in the range of light to moderate work. Transgressions of the limiting value of the body temperature of 39°C did not occur. Apart from one exception a continuous increase of the heart-beat rate was not found. Increased stresses can be expected especially for blasting truck operators and repair works. Laboratory and simulation tests agree with the results of the present field investigation considering special limiting conditions. In salt mining Niedersachsen the application of the dry-bulb temperature as standard seems justified, as more other measures of climate, are not expected to yield more accurate data.

43401 **(DOE/SR/00952—T6) Nuclear-fuel-cycle education: Module 6. Criticality safety.** Knief, R. (New Mexico Univ., Albuquerque (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 276p. NTIS, PC A13/MF A01. Order Number DE83015186.

Portions are illegible in microfiche products.

This educational module on criticality safety has chapters devoted to: fundamentals of nuclear criticality safety, nuclear criticality safety experience base, tools for criticality evaluation, subcritical limits, regulation and related impacts, the general practice of nuclear criticality safety, and plant applications.

0550 Regulations

REFER ALSO TO CITATION(S) 43365

43402 **(DOE/SR/00952—T8) Nuclear-fuel-cycle education: Module 9. Safeguards.** O'Hara, F.A. (Ohio State Univ., Columbus (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 109p. NTIS, PC A06/MF A01. Order Number DE83015544.

Portions are illegible in microfiche products.

This module covers the following: history and concepts of nuclear materials safeguards; public concern with the nuclear fuel cycle; nuclear power and the proliferation issue; methods of nuclear materials safeguards accountability; statistical methods of nuclear materials safeguards; and measurements for nuclear materials safeguards.

43403 (ER—81-2E, pp 331-351) **International non-proliferation regime. An historical overview.** 1981. NTIS (US Sales Only), PC A16/MF A01.

In Nuclear policy review background papers.

The international nonproliferation regime of 1980 is composed of widely varying national policies (Canada's being among the most stringent), of multinational agreements such as the Nuclear Suppliers Group Guidelines, and of international agreements such as the IAEA's Statute and the NPT. The IAEA's safeguards system has been developed as one element of this regime. The evolution of the current international nonproliferation regime from 1945 to 1980 has entailed the interaction between efforts to formulate a way of eliminating the use of atomic energy for destructive purposes and promoting its peaceful use. There has been a continuing effort to establish an appropriate balance between these principles, which have been recognized in national policies, in the Statute of the IAEA, in the NPT, and in the INFCE.

43404 **(IPSN-RA—1981) Annual progress report 1981.** (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). 1982. 147p. (In French). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83702227.

This annual progress report of the CEA Protection and Nuclear Safety Institut outlines a brief description of the progress made in each section of the Institut. Research activities of the Protection department include, radiation effects on man, radioecology and environment radioprotection techniques. Research activities of the Nuclear Safety department include, reactor safety analysis, fuel cycle facilities safety analysis, safety research programs. The third section deals with nuclear material security including security of facilities, security of nuclear material transport and monitoring of nuclear material management.

43405 **(LA—9781-M) End-crop box counter manual.** Sprinkle, J.K. Jr.; Stephens, M.M. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 49p. NTIS, PC A03/MF A01. Order Number DE83014798.

Portions are illegible in microfiche products.

The end-crop box counter was designed at Los Alamos National Laboratory for assaying filled shipping boxes of end crops from the fuel-extrusion process used in fuel-rod fabrication at United Nuclear Corporation. This manual details the measurement technique and the hardware, software, and calibration. It also provides instructions for operation and troubleshooting. The section on operation can be used as a separate operations manual by the routine user.

43406 **(LA—9824-MS) Real-time inventory system for special nuclear material in storage.** Nicholson, N.; Atencio, J.D.; Kuckertz, T.H.; Ethridge, C.D. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 20p. NTIS, PC A02/MF A01. Order Number DE83015595.

Special nuclear material (SNM) in long-term storage is particularly vulnerable to diversion, hence it must be inventoried periodically. Inventory procedures are time consuming and expose personnel unnecessarily to radiation. Los Alamos scientists have developed an alternative method for taking inventory: a system that provides continuous surveillance of all SNM stored in a vault. The system features a network of shelf monitors, one monitor for each container in storage. A shelf monitor detects the gamma-ray emissions and weight of the container resting on it and transmits the data in real time to a minicomputer for analysis. Reliable and inexpensive, the shelf monitors are attractive for deployment in a storage facility where hundreds or thousands of them are required.

43407 **(NLCO—1192) Data-acquisition system for the NLO error-propagation exercise.** Lower, C.W.; Gessiness, B.; Bieber, A.M. Jr.; Keisch, B.; Suda, S.C. (NLO, Inc., Cincinnati, OH (USA); Brookhaven National Lab., Upton, NY (USA)). 1 Jul 1983. Contract AC05-76OR01156. 6p. (CONF-830709—18). NTIS, PC A02/MF A01. Order Number DE83014879.

From 24. annual meeting of the Institute of Nuclear Materials Management; Vail, CO, USA (10 Jul 1983).

Portions are illegible in microfiche products.

An automated data-acquisition system using barcoded labels was developed for an error-propagation exercise to determine the limit of error for inventory differences (LEID) for a material balance area at NLO, Inc.'s Feed Materials Production Center, Fernald, Ohio. Each discrete item of material to be measured (weighed or analyzed) was labeled with a bar-coded identification number. Automated scale terminals, portable bar-code readers, and an automated laboratory data-entry terminal were used to read identification labels and automatically record measurement and transfer information. This system is the prototype for an entire material control and accountability system.

43408 **(NUREG/CR—0200-Vol.1-R2) SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 1. Control modules.** (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 211p. (ORNL/NUREG/CSD—2/Vol.1-R2). NTIS, PC E08/MF A01. Order Number DE83013778.

Portions are illegible in microfiche products.

This manual provides documentation for a new, multifaceted computational system called SCALE (Standardized Computer Analyses for Licensing Evaluation) that has been developed to provide a standard analysis tool for use by the NRC staff and licensees in evaluating nuclear-fuel facility and package designs. The SCALE system consists of several automated analytical sequences (control modules) which perform criticality, shielding, and/or heat transfer calculations with a minimum of user-required input. The computer codes (functional modules) used within each analytical sequence can also be run in a stand-alone fashion or coupled together in a sequence determined by the user.

43409 **(NUREG/CR—0200-Vol.2-Rev.1) SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 2. Functional modules.** (Oak Ridge National Lab., TN (USA)). Jun 1983. Contract W-7405-ENG-26. 306p. (ORNL/NUREG/CSD—2/Vol.2/Rev.1). NTIS, PC A14/MF A01 - GPO. Order Number DE83013780.

This manual provides documentation for a new, multi-faceted computational system called SCALE (Standardized Computer Analyses for Licensing Evaluation) that has been developed to provide a standard analysis tool for use by the NRC staff and licensees in evaluating nuclear-fuel facility and package designs. The SCALE system consists of several automated analytical sequences (control modules) which perform criticality, shielding, and/or heat-transfer calculations with a minimum of user-required input. The computer codes (functional modules) used within each analytical sequence can also be run in a stand-alone fashion or coupled together in a sequence determined by the user.

43410 **(NUREG/CR—3221) MC and A reform amendment: variance estimates and performance evaluation.** Stirpe, D.; Goldman, A.S.; Gutmacher, R.G. (Los Alamos National Lab., NM (USA)). May 1983. Contract W-7405-ENG-36. 151p. (LA—9708-MS). NTIS, PC A08/MF A01. Order Number DE83015195.

Variance estimates and tests for compliance with the loss-detection provisions of the proposed materials control and accounting (MC and A) Reform Amendment are given for each of the MC and A systems of the three process lines that make up Example System Beta. These lines are (1) UF_6-to-oxide conversion, (2) high-temperature gas reactor (HTGR) coated-particle fabrication, and (3) uranium scrap recovery. For each material control unit (MCU) in the MC and A systems for these lines, we identify measurement points and appropriate measurement techniques; we present the materials balance and variance equations; we calculate the associated standard deviations; and finally, we test the MC and A systems for compliance with the Reform Amendment loss-detection requirements. Wherever potential problems in satisfying the requirements of the MC and A Reform Amendment are recognized, we suggest alternative MCU structures that incorporate additional measurement capability of modifications to the process. With appropriate process/instrumentation modifications of the conversion and scrap recovery processes, the prompt loss-detection provisions of the reform amendment can be satisfied without imposing administrative controls. Levels of performance against trend and cumulative loss requirements are also assessed. The reference HTGR coated-particle process satisfies some of these provisions if administrative controls are imposed.

43411 **(SAAS—295) Sample size optimization in nuclear material control. 1. Random sampling for the variables test.** Gladitz, J.; Hoffmann, K.; Willuhn, K. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). 1982. 33p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702203.

Equations have been derived and exemplified which allow the determination of the minimum variables sample size for given false alarm and detection probabilities of nuclear material losses and diversions, respectively.

43412 **(SAAS—296) Sample size optimization in nuclear material control. 2. Random sampling for the attribute test.** Gladitz, J.; Hoffmann, K.; Willuhn, K. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). 1982. 17p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702204.

Statistical problems involved in nuclear material control of discrete fuel units by means of attribute inspection have been investigated, starting from the assumption that relatively great diversions have been made abruptly from a small number of fuel units in order to keep low the probability of detection in sampling. Using techniques of statistical quality control, optimum test plans were derived by means of which significant judgement can be given on potential diversions at given minimum detection probabilities.

43413 **(Y/DW—406) Remote data acquisition and storage of periodic liquid uranium hexafluoride assay enrichments.** Kaiser, K.W.; Dunigan, J.J. (Oak Ridge Y-12 Plant, TN (USA)). 30 Jun 1983. Contract W-7405-ENG-26. 39p. NTIS, PC A03/MF A01. Order Number DE83015060.

Portions are illegible in microfiche products.

Hardware and software have been developed to support an International Atomic Energy Agency Project to collect and store liquid uranium hexafluoride assay enrichment data. An assay enrichment monitor was installed in one of the liquid uranium hexafluoride product withdrawal lines at the Oak Ridge Gaseous Diffusion Plant (ORGDP). A hierarchial computer system was used to collect and store the data. A microprocessor-based control system in the enrichment monitor was used to calculate, store, and transmit data. A remote computer with disk storage peripherals, located elsewhere at ORGDP, collected and temporarily stored assay data that were collected from the enrichment monitor. A host computer located at the Oak Ridge Y-12 Plant transferred the temporary files weekly from the remote computer to the host for permanent storage on magnetic tape. Links between the three computer levels used DECnet and leased telephone lines.

43414 **Safeguards instrumentation: past, present, future.** Higinbotham, W.A. (Brookhaven National Laboratory Upton, New York). *Nuclear Materials Management;* XI: No. 2, 82-86(Sum 1982).

Instruments are essential for accounting, for surveillance and for protection of nuclear materials. The development and application of such instrumentation is reviewed, with special attention to international safeguards applications. Active and passive nondestructive assay techniques are some 25 years of age. The important advances have been in learning how to use them effectively for specific applications, accompanied by major advances in radiation detectors, electronics, and, more recently, in mini-computers. The progress in seals has been disappointingly slow. Surveillance cameras have been widely used for many applications other than safeguards. The revolution in TV technology will have important implications. More sophisticated containment/surveillance equipment is being developed but has yet to be exploited. On the basis of this history, some expectations for instrumentation in the near future will be presented.

06 FUSION FUELS

0602 Processing

43415 (IPPCZ—244, pp 103-104) **Coating of laser fusion targets by plasma polymerized organic thin films.** Janca, J. (Universita J.E. Purkyne, Brno (Czechoslovakia). Prirodovelecka Fakulta). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

0607 Waste Management

43416 **Issues in radioactive waste management for fusion power.** Maninger, R.C.; Dorn, D.W. (Lawrence Livermore National Laboratory, University of California, P.O. Box 5511 Livermore, CA 94550). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* 30: No. 1, 571-576(Feb 1983). Contract W-7405-ENG-48.

Analysis of recent conceptual designs reveals that commercial fusion power systems will raise issues of occupational and public health and safety. This paper focuses on radioactive wastes from fusion reactor materials activated by neutrons. The analysis shows that different selections of materials and neutronic designs can make differences in orders-of magnitude of the kinds and amounts of radioactivity to be expected. By careful and early evaluation of the impacts of the selections on waste management, designers can produce fusion power systems with radiation from waste well below today's limits for occupational and public health and safety.

0608 Properties

REFER ALSO TO CITATION(S) 44644

07 ISOTOPE AND RADIATION SOURCE TECHNOLOGY

0702 Radiation Sources

REFER ALSO TO CITATION(S) 44527

0703 Isotopic Power Supplies

43417 **(LA—9813-PR) Space nuclear-safety program. Progress report, January 1983.** Bronisz, S.E. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 21p. NTIS, PC A02/MF A01. Order Number DE83014775.

This technical monthly report covers studies related to the use of $^{238}PuO_2$ in radioisotope power systems carried out for the Office of Special Nuclear Projects of the US Department of Energy by Los Alamos National Laboratory. Most of the studies discussed here are ongoing. Results and conclusions described may change as the work continues.

08 HYDROGEN

0801 Production

REFER ALSO TO CITATION(S) 43424, 43525

43418 **Seawater-based hydrogen production by immobilized marine photosynthetic bacteria.** Matsunaga, T.; Mitsui, A. (Univ. of Miami, FL). *Biotechnology and Bioengineering Symposium;* No. 12, 441-450(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The marine photosynthetic bacteria Rhodopseudomonas sp. Miami PBE 2271 were immobilized on an agarose coated polyster film with agar. Hydrogen was photoproduced at the rate as high as 180 μmol/mg B Chl/h, or 445 mL/g dry cell/h. Photoproduction of hydrogen of immobilized cells were markedly protected from the inhibitory effect of oxygen and nitrogen. Immobilized cells exhibit markedly wider salt tolerance (5 to 100% salinity) than aqueous cell suspension. Immobilized cells continuously photoproduce hydrogen at the same rate over a 10-day period. Hydrogen photoproduction capability did not decrease for more than 90 days when immobilized cells were stored in the seawater. 7 figures, 1 table.

43419 **Application of intact algae to the biophotolysis.** Greenbaum, E. (Oak Ridge National Lab., TN). *Biotechnology and Bioengineering Symposium;* No. 12, 469-474(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The utilization of intact algae for the simultaneous light-activated production of molecular hydrogen and oxygen is discussed. Experimental data on the long-term stability and endurance of hydrogen and oxygen photoproduction by anaerobically adapted Chlamydomonas reinhardtii is presented. The general conclusion that can be derived from this work is that Chlamydomonas (and probably other microscopic eukaryotic algae) are extremely rugged organisms with respect to the biophotolysis problem. Working with a sample of wild-type Chlamydomonas reinhardtii, the simultaneous photoproduction of hydrogen and oxygen was observed for approximately 100 h. The bleached algae were then removed from the reactor and used as the inoculum in fresh growth medium. These second-generation cells regreened and were able to photoproduce hydrogen and oxygen initially at ten times the rate of the first generation cells and had better survivability characteristics as indicated by their chlorophyll content after 200 h. 2 figures.

0802 Storage

REFER ALSO TO CITATION(S) 44244

43420 **(EUR—8507-EN) Magnesium hydride for load-leveling energy storage. Final report.** Vigeholm, B. (Risoe National Lab., Roskilde (Denmark)). 1983. 111p. ECIS, 2100 M Street N.W., Suite 707, Washington, DC 20037.

Some of the magnesium properties essential to the applicability of the reaction Mg + H_2 reversible MgH_2 as a hydrogen storage system have been investigated. Three magnesium powders with particle size smaller than 50 μm average diameter were cycled, over 31, 71 and 151 cycles respectively, at 675 K (400°C) and at absorption pressures, 2 to 3 MPa. The powders absorbed and desorbed 60 to 95% of the theoretically maximal amount of hydrogen given by stoichiometric MgH_2. The reaction rates changed negligibly over the extent of the experiments permitting the mentioned hydrogen exchange to be completed in less than 20 minutes. At the experimental conditions, absorption and desorption rates were very similar, the desorption generally slightly the faster, 4 to 9 min. compared to 7 to 10 min. The storage capacity dropped in the experiments performed at constant, high temperature to approximately 60%. This is assigned partly to magnesium oxide formation partly to sintering of the particles into larger conglomerations. A high-capacity, automatic cycling facility suitable for a more-comprehensive investigation of the long-term capacity parameters have been constructed and tested but not yet applied.

09 OTHER SYNTHETIC AND NATURAL FUELS

REFER ALSO TO CITATION(S) 43283

43421 **Fourth symposium on biotechnology in energy production and conservation.** Scott, C.D. (ed.). New York, NY; John Wiley and Sons, Inc. (1982). 480p. (CONF-820580—). Contract W-7405-ENG-26.

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

This document contains papers presented at the symposium. The purpose of the symposium was to bring together the various disciplines and institutions involved in developing viable, new biotechnology for conversion of renewable resources to fuels and chemical feedstocks and for energy efficient environmental control technology. Techniques and the impact of genetic enhancement were discussed as well as innovative process developments and advanced concepts. Separate abstracts were prepared for each article for inclusion in the Energy Data Base. (DMC)

0901 Hydrocarbon Fuels

REFER ALSO TO CITATION(S) 43456, 43541, 44368

43422 **(CONF-830664—4) Support research for biomass thermal-gasification development.** Onischak, M.; Babu, S.P.; Kosowski, G. (Institute of Gas Technology, Chicago, IL (USA)). 1983. 12p. Institute of Gas Technology, 3424 South State Street, IIT Center, Chicago, IL 60618.

From International gas research conference; London, UK (13 Jun 1983).

The Institute of Gas Technology, Chicago, IL, is conducting research on biomass characterization, handling, devolatilization, and char gasification to develop a single-stage, pressurized, oxygen/air blown, fluidized-bed gasifier. Characterization of a wide variety of biomass species showed insignificant differences in proximate and ultimate analysis when expressed on a dry, ash-free basis. In general, the density of biomass is greater than that of its char, which requires special considerations in gasifier design. Ash fusion temperatures were significantly greater than the anticipated average gasifier temperature. It is possible to drive away the film and adsorbed moisture and dry biomass to about 6%, which may be desirable for some gasification strategies. The fluidization data obtained with biomass char mixed with sand or alumina are useful for gasifier design and operation. Data were also obtained to determine the effect of process variables on reaction rates and product yields during biomass devolatilization and char gasification. Based on these investigations, a 455 kg/h process research unit was constructed for operation at 2.17 MPa and 1089 K.

43423 **(DOE/PC/30022—2) Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981.** Kuo, J.C.W. (Mobil Research and Development Corp., Paulsboro, NJ (USA)). Apr 1981. Contract AC22-80PC30022. 33p. NTIS MF A01. Order Number DE81027500.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

The design phase of the bench-scale pilot plant of the two-stage slurry Fischer-Tropsch/ZSM-5 process has been completed. The shop fabrication phase of the BSU has been initiated, and all major purchasing orders have been issued. The simple mathematical model of the F-T bubble column reactor has been improved and used to assist the design of the reactor. The kinetic constants required for the mathematical model were estimated using the experimental data from published sources.

43424 (NP—3770045, pp vp) **Fuels of the future.** Griesbaum, K.; Hoenicke, D. May 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

Also published in: Natural Resources and Development (1981) v. 13 p. 30-58.

In Institute in the year of 1981.

Methods for the production of alternative fuels from oil shale, tar sands and coal and from methanol and ethanol are given and discussed. For the production of hydrogen from no hydrocarbon containing sources modern electrolysis processes are indicated and a thermochemical process is explained by the example of the iron sulfate-cyclic process. The principles of the steam gasification of coal with high-temperature nuclear heat to produce hydrogen are treated.

43425 **(PNL-SA—11306) Proceedings of the 15th biomass thermochemical conversion contractor's meeting.** (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 494p. (CONF-830323—). NTIS, PC A21/MF A01. Order Number DE83013366.

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Portions are illegible in microfiche products.

Papers presented at the Symposium are included in this publication. Topics range from the production of woody biomass to the production and utilization of the biomass derived fuels. Separate abstracts have been prepared for individual papers for inclusion in the Energy Data Base. (DMC)

43426 (PNL-SA—11306, pp 14-30) **Steam gasification of wood in a fluidized bed using indirect heating with fire tubes.** Flanigan, V.J.; Findley, M.E.; Sineath, H.H. (Univ. of Missouri, Rolla). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

This paper describes the progress in designing and constructing the 20″ indirect fired steam gasifier. The intent of the work is to provide a fluidized bed gasifier using steam to gasify woody biomass. The energy requirements to drive the gasification reactions are provided by transferring energy through tubes submersed in the bed. The energy for the hot gases inside the tubes is provided by a combustion chamber using propane as fuel. The system design and operation is described. Data from a 10″ pilot reactor is included to suggest the proposed reactor performance. The 20″ reactor status is at the point of initial testing and initial data may be available at the meeting. 7 figures, 4 tables.

43427 (PNL-SA—11306, pp 31-90) **Gasification of forest residues in a high-throughput gasifier.** Feldmann, H.F.; Paisley, M.A.; Appelbaum, H.R. (Battelle's Columbus Labs., OH). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

The production of a nominal 500 Btu/SCF product gas from physically diverse biomass including sawdust, wood chips, and coarsely shredded bark in a high-throughput non-oxygen using gasification system is described. The gasification system employs sand circulating between the gasifier and a proprietary high-throughout fluid-bed combustor to provide heat which is generated by the combustion of the residual biomass char. A new gasification contacting scheme developed under this program is shown to significantly improve gasifier performance resulting in a substantial estimated cost benefit. A preliminary estimate of the economics of cogeneration was made comparing direct combustion to generate steam for an expansion turbine with both the Battelle gasification process and a pressurized oxygen-blown gasifier. 19 figures, 13 tables.

43428 (PNL-SA—11306, pp 130-138) **Development of biomass gasification to produce substitute fuels.** Kosowski, G.M.; Onischak, M.; Babu, S.P. (Inst. of Gas Tech., Chicago, IL). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

The procurement activities for the construction of the process research unit (PRU) began after DOE authorization was received on December 31, 1981. The major PRU vessels were delivered on-site at the end of June 1982. Other auxilliary equipment was delivered by August 1982. Construction of the PRU system was completed at the beginning of March 1983, eight months after delivery of the major system vessels. Shakedown activities and a planned schedule of shakedown tests were begun in March. The tests conducted were cold pressure tests, hot nitrogen pressure and flow tests, and a 44 hour hot nitrogen test to dry the refractory linings and begin refractory curing. A test with reactive solids to heat-up the system to gasification temperatures is scheduled to be completed at the end of March. 1 figure.

43429 (PNL-SA—11306, pp 139-180) **Predictive model for stratified downdraft gasification of biomass.** Reed, T.B.; Markson, M. (Solar Energy Research Inst., Golden, CO). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

A new, simpler form of downdraft gasifier, the stratified downdraft gasifier is being developed. In its simplest form it is a cylindrical tube with a grate at the bottom. Air or oxygen and biomass are fed together at the top and move down into a flaming pyrolysis zone where the oxidant burns the emerging pyrolysis gases and tars to provide the heat for pyrolysis. The gas then enters an adiabatic char reaction zone where the char further reduces the gas to the final composition and a temperature between 700 and 800°C. At present, three such gasifiers are in operation at SERI; a 5 cm transparent quartz gasifier for research; a 10 hp producer; and a 1 ton/day oxygen gasifier. A model has now been formulated to predict the behavior of the stratified downdraft gasifiers for a wide variety of input conditions including fuel density, size, shape, moisture content and oxygen concentration. The model is based on two active zones. The upper flaming pyrolysis zone as been modeled on data derived for flaming combustion of wood, modified for the flaming pyrolysis conditions. When pyrolysis is complete, the adiabatic char/gas reaction rapidly quenches and reduces the gases to the final composition, droping the temperature to 700 to 800°C, where the char reactions cease. The reduction zone has been modeled based on computer integration of reaction rates taken from kinetic data on the literature. The results are compared to those observed on the various gasifiers. 15 figures, 8 tables.

43430 (PNL-SA—11306, pp 181-222) **Development of an indirectly heated pyrolysis reactor.** Clements, L.D.; Cho, C.H.; Moser, R.; Fang, H.Y.; Ginn, L.L.; Jeffrey, J.P. (Texas Tech Univ., Lubbock). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Several tasks are involved in the development of a novel, indirectly heated pyrolysis reactor. The bases for the pyrolysis reactor concept under development in this project are: (1) indirect heating is preferred during pyrolysis in order to minimize the amount of combustion products in the product gas; (2) indirect heating should be carried out using a geometry which puts the heat source within the reaction volume rather than around the reaction volume; (3) indirect heating may be accomplished on a volumetric basis by using a set of internal fire tubes which use a small portion of the product gas as a fuel; and (4) the composition of the product gas is responsive to changes in pyrolysis pathway as a result of factors such as changes in heating rate, carrier gas composition, and particle size. This paper summarizes the development of a design for the five tubes used for indirect heating, design of a test stand for evaluating fire tube performance, and design of a test stand to evaluate the effects of fire tube geometry on bed fluidization characteristics. The theoretical basis for analyzing radiant heat transfer in fluidized beds of biomass materials and preliminary experimental results are described in some detail. 27 figures, 1 table.

43431 (PNL-SA—11306, pp 223-235) **Utilization of waste streams in biomass gasifiers.** McGowan, T.F.; Jape, A.D.; Walsh, J.L. (Georgia Inst. of Tech., Atlanta). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Biomass gasification yields condensible tars which pose environmental disposal problems. These tars contain a wide variety of toxic and carcinogenic compounds and are high in carbon, color and BOD. The need to treat effluents from gasification systems before discharge to the environment is a recognized fact. Past attempts to deal with this problem include waste water treatment technology (expensive and problematic) and return of the liquid directly to the gasifier (causing revaporization, corrosion, coking and burnout of the distribution system). Georgia Tech has a patent pending on a new method using thermo-chemical pretreatment of the tar and aqueous effluents before returning them to the gasifier as a supplementary feedstock. The US Department of Energy has funded a project to complete the design and test its use with an up-

draft gasifier. The first year's effort is a simulation of the process using Georgia Tech's one million Btu/hr updraft gasifier. Computer simulations will also be done to assess the process effects on gas quality. Second year efforts will include construction of a prototype to consume actual tar and aqueous effluents. 3 figures.

43432 (PNL-SA—11306, pp 236-256) **Technical and economic assessment of emerging advanced biomass thermochemical conversion techniques.** Wan, E.I.; Price, J.D. (Science Applications, Inc., McLean, VA). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Science Applications, Inc. (SAI), is conducting an on-going technical and economic study to assess the commercial applicability of various experimental gasification and pyrolysis systems for the production of chemicals and fuels from biomass. This report summarizes the technical and economic results of: (1) a detailed process sensitivity analysis for integrated biomass-to-methanol processes, and (2) a comparative evaluation of a flash methanolysis process developed at BNL and a pressurized catalytic gasification process developed at PNL. A computerized process flowsheet simulator was developed to establish process material and energy balance data for two conceptual process plants utilizing the BNL and PNL process concepts. The capital costs and O & M costs were estimated for each plant configuration. Methanol production costs were also estimated for process plants based on existing experimental data and future extrapolated data. 7 figures, 6 tables.

43433 (PNL-SA—11306, pp 300-357) **Ablative entrained flow fast pyrolysis status.** Diebold, J.; Scahill, J. (Solar Energy Research Inst., Golden, CO). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Progress with the entrained flow cyclonic reactor at SERI is detailed. Feedstocks successfully used include wood flour and fairly large sawdust. Preliminary results show that relatively complete vaporization of the biomass is realized and that the yields of tar or gas can be varied over quite a range with trends following first order kinetics. The effect of the ratio of steam to biomass was investigated and found to be minor compared to cracking severity. If this is true, the amount of steam can be reduced to levels which will allow a much more favorable energy balance for the process. The current results indicate that a 15% by weight conversion is possible of the dry softwood feedstock to olefins and aromatic liquids. Additional process variable studies need to be completed to see if this is an upper limit for softwood feedstocks. 7 figures, 4 tables.

43434 (PNL-SA—11306, pp 358-408) **Fundamental pyrolysis studies.** Milne, T.A.; Evans, R.J.; Soltys, M.N. (Solar Energy Research Inst., Golden, CO). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Progress on the direct mass spectrometric sampling of pyrolysis products from wood and its constituents is described for the period from June, 1982 to February, 1983. A brief summary, and references to detailed reports, of the qualitative demonstration of our approach to the study of the separated processes of primary and secondary pyrolysis is presented. Improvements and additions to the pyrolysis and data acquisition systems are disccussed and typical results shown. Chief of these are a heated-grid pyrolysis system for controlled primary pyrolysis and a sheathed-flame arrangement for secondary cracking studies. Qualitative results of the secondary cracking of cellulose, lignin, and wood are shown as are comparisons with the literature for the pyrolysis spectra of cellulose, lignin, and levoglucosan. Fingerprints for a number of materials are shown, with spectra taken under carefully controlled conditions so that sensitivity calibrations for different compounds, now being determined, can be applied. 33 figures.

43435 (PNL-SA—11306, pp 409-420) **Entrained flow pyrolysis of biomass.** Knight, J.A.; Gorton, C.W.; Kovac, R.J. (Georgia Inst. of Tech., Atlanta). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

This research effort concerns determining the conditions for maximum oil yield in the entrained flow pyrolysis of hardwoods. The background associated with the research, including the utilization of pyrolytic oil, and the oil yield as a function of the mode of pyrolysis is presented. The progress on the project since June, 1982 is described. This effort involved completing the construction of the Process Development Unit along with the associated controls and instrumentation. The PDU is described and its operation is discussed. The results of a series of preliminary runs are given and analyzed, and the project plans for the immediate future are presented. 1 figure, 5 tables.

43436 (PNL-SA—11306, pp 445-454) **Advanced laboratory-scale extruder-reactor biomass liquefaction unit.** White, D.H. (Univ. of Arizona, Tucson). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Under DOE funding, a modified extruder has been shown to be capable of pumping slurries of 60 percent wood by weight, compared to only 10 to 20 percent in conventional systems. The ability to handle such concentrations is expected to improve direct liquefaction process economics substantially by reducing recycle oils by 80 percent, decreasing preheat and reactor heat loads three-fold, eliminating drying and special grinding of wood chip feedstocks, eliminating the troublesome preheater by partially using the extruder-feeder as such, and producing a higher quality wood oil by less exposure to high temperatures. An advanced laboratory-scale extruder-reactor biomass liquefaction unit has been designed; it will be constructed and initially operated at the University of Arizona over the next 15 months. 1 figure, 1 table.

43437 (PNL-SA—11306, pp 455-466) **Basic research in biomass direct liquefaction.** Elliott, D.C. (Pacific Northwest Lab., Richland, WA). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

This report summarizes the progress of this process research and product analysis effort during the nine months from June 1982 to March 1983. The two major thrusts of this project have been product upgrading tests and support of a joint project on biomass liquefaction sponsored by the International Energy Agency (IEA). The upgrading tests have been comprised of both hydrotreating tests of wood-derived oil and distillates and also studies of distillation and coking of the oil. The contribution to the IEA program has included contributions to the Techno-economic assessment, a review of the US state of the art and development of a plan for analyzing and upgrading the products of comparative tests of biomass liquefaction. 2 figures, 2 tables.

43438 (PNL-SA—11306, pp 467-483) **Preliminary experiments on direct liquefaction of biomass by solvolysis and catalytic hydrogenation.** Davis, H.G.; Watt, D.W. (Lawrence Berkeley Lab., CA). May 1983. NTIS, PC A21/MF A01. (CONF-830323—). Contract AC03-76SF00098.

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

It was concluded that the solvent-recycle, solvolysis and hydrogenation route can lead to an acceptable, practicable way to convert biomass to distillable liquids. Information was gained on the chemistry of solvolysis, optimum hydrogenation for reducing oxygen content with only a moderate increase in H/C ratio and conditions for obtaining the optimum degree of hydrocracking. The results gained were also applicable to forms of biomass other than wood. 1 figure, 6 tables. (DP)

43439 **(SERI/STR—231-1910) Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981.** Clausen, E.C.; Gaddy, J.L. (Arkansas Univ., Fayetteville (USA). Dept. of Chemical Engineering). Apr 1983. Contract AC02-77CH00178. 95p. NTIS, PC A05/MF A01. Order Number DE83011969.

The overall objective of this three-year research project is to study the reaction kinetics of the anaerobic digestion process in both batch and continuous flow reactors. Anaerobic digestion of corn stover in continuous laboratory reactors has been found to follow first-order kinetics. A large number of microorganisms were screened for their ability to provide cellulolytic activity or produce methane intermediates. Clostridium butyricum was found to be the most promising. Batch studies involving culture enhancement with C. butyricum have shown a 42 percent increase in methane production. In continuous culture, enhancement with C. butyricum increases the first-order rate constant by 20 percent. These improvements in the reaction rate translate into significant reductions in capital cost for industrial processes. The design of a 3-ton-per-day demonstration unit to produce methane from corn stover has been completed. This design is based upon standard kinetics with two reactors in series. The capital cost for this unit is estimated to be $600,000 with annual operating cost of $200,000. Inoculation and agitation studies were conducted in the laboratory to determine the appropriate inoculation ratio for corn stover and the agitation requirements for batch farm scale systems. Agitation studies have shown that continuous agitation in batch laboratory reactors is unnecessary. Periodic agitation of only 10 minutes per day is necessary to prevent scum formation and promote mass transfer. The farm demonstration unit continued to operate to produce methane and electricity for farm use. The unit operated with 75 percent overall energy efficiency and can produce methane for $1.80 to $6.50 per 10^6 Btu, and electricity for $.04 to $.13 per kWh, depending upon the biomass and capital charges.

43440 **Low-Btu gas from a small-scale fluidized bed reactor using sawdust feeds.** Flanigan, V.J.; Shimon, J.E.; Punyakumleard, A. (Univ. of Missouri-Rolla, MO). pp 645-664 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

Experimental results from a six inch, airblown, fluidized bed gasifier are evaluated in terms of residence time. Extensive previous work gasification ended with the conclusion that temperature was the most important single parameter. The results of this study indicate that, once sufficient thermal energy is available for gasification, residence time (which is closely related to air flow rate) becomes the dominate parameter. That is, residence time should be varied to optimize the gasification process. Results of operating the gasifier at temperatures higher than 1500°F (816°C) are discussed. A limited amount of recirculation of the product gas through the gasifier (recycling) reduced the nitrogen dilution significantly.

43441 **Liquid fuels from wood by continuous operation of the Albany, Oregon biomass liquefaction facility.** Thigpen, P.L.; Berry, W.L. Jr. (The Rust Engineering Co., Birmingham, AL). pp 1057-1095 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

A DOE process development unit was operated by The Rust Engineering Company in Albany, Oregon from July 1978 through June 1981 for direct thermochemical conversion of biomass to liquid fuels. In this process a syngas mixture of carbon monoxide and hydrogen in the presence of sodium carbonate is reacted with wood slurries at pressures of 3,000 psig and temperatures around 700°F. A product comparable to No. 6 fuel oil was produced in barrel quantities. Distillate from this crude product has characteristics similar to No. 2 fuel oil. The crude liquid product has a heating value of up to 16,000 Btu per pound, specific gravity of 1.1, viscosity of 200 cp at 210°F and an oxygen content of 7 percent. Heating value of the distillate is 17,400 Btu per pound, viscosity 11 cp, and oxygen content is 6.2 percent. Yields up to 53 pounds of wood derived oil per 100 pounds of wood were obtained. Other forms of biomass (crop waste and manure) as well as municipal solid waste have been liquefield at laboratory scale and could be processed in the process development unit with modifications. This paper discusses operations of the plant and equipment, characterization of product, and possibilities for future commercialization.

43442 **Production of liquid fuels and chemical feedstocks from milkweed.** Adams, R.P. (Plant Resources Inst., Salt Lake City, UT). pp 1113-1128 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—). Contract AC03-81CS84009.

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

Alternative sources of fuel and chemical feedstock from milkweeds are discussed. The common milkweeds (Asclepias species) produce hydrocarbons that can be cracked to fuels, possible chemical feedstocks, and a residue (after extraction) that is high in protein and highly digestible. Research during the past two years has centered on agronomy and chemical composition analyses. Agronomic problems are seedling establishment, weed control, harvesting, and storage of material until processing. Many of these problems have now been solved and the agronomic potential for domestication appears very favorable. Chemical analyses has revealed triterpenoids and natural rubber in the hexane extract with polyphenolics, inositol and sucrose in the methanol extract. Additional results are reported on commercial extraction technology. The asclepias species are compared with other promising hydrocarbon species and problems involved in the domestication of these kinds of species are discussed. These energy crops appear to be economically feasible when a multi-use approach is used but they are not feasible if only the hydrocarbons are utilized.

43443 **Fluidized-bed energy technology for biomass conversion.** Soltes, E.J.; Lepori, W.A.; Pollock, T.C. (Texas A & M Univ., College Station). *Biotechnology and Bioengineering Symposium;* No. 12, 15-29(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Fluidized-bed technology offers several unique features for use in small-scale biomass energy conversion. Results are reported in the use of a 61-cm fluidized-bed reactor for combustion and on the use of 61-, 30-, and 5-cm reactors for gasification. combustion trials using agricultural biomass feeds have identified several problem areas. Slagging and fouling can occur at bed temperatures as low as 760°C. Moreover, metal coupons placed in the hot exhaust gas stream experienced high rates of corrosion and erosion. Gasification experiments have confirmed that a fluidized bed will accept a wide range of biomass feeds (rice hulls, corncobs, sorghum stalks, cottom gin trash) and convert them into a low-Btu combustible gas. Slagging and fouling were not as severe when operating the fluidized bed in the gasification mode. Gas cleanup requirements as well as technical needs in evaluating corrosion of reactor construction materials are identified. Coupling of the 61-cm reactor to a steam boiler is described. Finally, the nature of fluidized-bed technology suggests potentials for biomass pyrolysis, and such use is examined. 2 figures, 5 tables.

43444 **Catalytic conversion of fermentation derived ethanol to gasoline.** Whitcraft, D.R.; Verykios, X.E.; Mutharasan, R. (Drexel Univ., Philadelphia, PA). *Biotechnology and Bioengineering Symposium;* No. 12, 279-283(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The results obtained in this study establish the technical feasibility of converting biomass-derived ethanol to liquid hydrocarbon fuels that can be readily used as an energy source. The effects of process variables on the distribution of the products were investigated but no optimization was attempted. Nevertheless, it is shown that over 80% of the hydrocarbons produced are in the liquid state. The light hydrocarbons produced can be recycled into the reactor so as to essentially produce only liquid products. This is supported from the results of this study, which indicate than an oligomerization process is taking place during the reaction, and from the results of other investigators using methanol as the feed over the same catalyst. The distribution of the liquid products obtained very closely resembles the components present in commercial unleaded gasoline. A preliminary energy analysis shows that the proposed method of recovery of ethanol from fermentation broths require approximately 800 to 1200 Btu/lb ethanol. Furthermore, important other advantages are realized when ethanol is convertd to gasoline

as compared to the direct use of ethanol as a fuel. The cost of producig gasoline from biomass is still significantly higher than the cost of petroleum-based gasoline. Nevertheless, biomass has an important advantage over petroleum; it is renewable. 3 figures.

43445 **Operational characteristics of anaerobic packed-bed reactors.** Young, J.C. (Univ. of Arkansas, Fayetteville); Dahab, M.F. *Biotechnology and Bioengineering Symposium;* No. 12, 303-316(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Laboratory and full-scale tests have shown that the operational characteristics of anaerobic packed-bed ractors are closely related to the physical design features of the reactor. The chemical oxygen demand (COD) removal efficiency seems to be inversely related to the upflow velocity through the void spaces within the media matrix. This means that the type and size of media are important factors in design but the efficiency does not seem to be related directly to either unit surface area or to porosity. While all operating characteristics have not been evaluated in depth and all design parameters have not been developed fully, anaerobic packed-bed reactors should be considered seriously as a method for converting a wide range of organic industrial wastes to methane gas. 7 figures, 1 table.

43446 **Anaerobic biological treatment of coal gasifier effluent.** Cross, W.H.; Chian, E.S.K.; Pohland, F.G.; Harper, S.; Kharkar, S.; Cheng, S.S.; Lu, F. (Georgia Inst. of Tech., Atlanta). *Biotechnology and Bioengineering Symposium;* No. 12, 349-363(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

An anaerobic reactor system consisting of two columns in series, containing Raschig rings and granular activated carbon, respectively, has been acclimated to operate on dilute coal gasification wastewater. The system has been successfully operated at loadings of 2.5 kg chemical oxygen demand (COD)/m^3d resulting in removals as high as 92% COD, 78% total organic carbon (TOC), 93% phenol, and 99% cresol. Methane gas was generated at a rate of 3.6 to 8.1 L/d. The effluent from the anaerobic system was treated in an aerobic nitrifying system for ammonia removal. Complete conversion of ammonia-nitrogen to nitrate-nitrogen occurred with further reduction in COD and TOC of 74 and 85%, respectively. 12 figures, 3 tables.

43447 **Kinetics and advanced digester design for anaerobic digestion of water hyacinth and primary sludge.** Chynoweth, D.P.; Dolenc, D.A.; Ghosh, S.; Henry, M.P.; Jerger, D.E.; Srivastava, V.J. (Inst. of Gas Tech., Chicago, IL). *Biotechnology and Bioengineering Symposium;* No. 12, 381-398(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

A research program centered around a facility located at Walt Disney World (WDW) is in progress to evaluate the use of water hyacinth (WH) for secondary and tertiary wastewater treatment, to optimize growth of WH under these conditions, and to convert the resultant primary sludge (PS) and WH to methane via anaerobic digestion. This article describes the status of the biogasification component of this program, which includes baseline and advanced digestion experiments with individual feeds and blends and the design of an experimental test unit (ETU) to be installed at WDW. Experiments with several blends demonstrated that methane yields can be predicted from the fractional content and methane yield of each component. The process was found to adhere to the Monod kinetic model for microbial growth, and associated kinetic parameters were developed for various feed combinations. A novel upflow digester is achieving significantly higher conversion than a stirred-tank digester. Of several pretreatment techniques used, only alkaline treatment resulted in increased biodegradability. A larger scale (4.5 m^3) experimental test unit is being designed for installation at WDW in 1982. 13 figures, 4 tables.

0902 Alcohol Fuels

REFER ALSO TO CITATION(S) 43424, 43425, 43432, 43444, 43516, 43517, 43524, 43541, 44052, 44127, 44368, 44784

43448 (CONF-8208141—, pp 466-490) **Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology.** Kirshenbaum, N. (Placer Amex, Inc., San Francisco, CA); Klett, F.; Stokes, C.A.; Winklepleck, G. 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The production of methanol from Alaskan coal using proven technology is a straightforward matter involving no unusual technological risks. The cost on an equivalent basis, e.g., making finished gasoline by direct hydrogenation of coal with no lower grade by-product fuels, is no more than other viable approaches to high octane motor vehicle fuels from coal. On the other hand, the product will cost more per million Btu than incremental gasoline made from crude oil. Methanol from coal appears to offer the quickest and most reliable way to deliver clean fuel to the west coast market for power generation and motor vehicle fuel use. Further, methanol is unique among liquid synfuels in the degree to which it can mitigate the critical air quality problems of the west coast. Given a solution to the initial price premium required for any synfuel, the markets for Beluga methanol exist now and in a volume several times the planned Beluga output. The problems facing synfuels investors are identical with those facing inventor-owned utilities when major new facilities are required. There must be an assurance that the higher cost of the new electrical energy can somehow be rolled in and that virtually all of the new output can be used on a base load basis. Otherwise, new power stations simply cannot be built. The choices facing the nation on liquid fuel security are no different than those faced in 1973 or that will be faced in the future until there is a proper balance among: (1) the relatively low cost petoleum fuels from domestic sources, (2) the more risky but similarly priced petroleum fuels based on imports, and (3) the higher cost synthetic fuels. This balance should be made in such fashion as to insure the lowest possible cost per barrel for petroleum imports and to insure a degree of security appropriate for national economic and defense needs.

43449 (CONF-8208141—, pp 491-500) **Keystone: a viable coal-to-methanol project.** Voytko, J.D.; Daugherty, D.P.; Gigliotti, F. (Westinghouse Electric Corp., Madison, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

Several aspects of the Keystone Project design make it particularly attractive for methanol production: the Westinghouse gasifiers operate at over 500 psi, thus significantly reducing compression requirements for synthesis gas going to the methanol loop as compared to those for lower pressure gasification processes; the virtual absence of tars and oils in the product gas results in water treatment processing much less complex than that for a downflow fixed-bed gasifiers; complete coal utilization is achieved through the ability of the gasification process to accept fine coal not suitable for fixed-bed gasification; heat recovery on the gasification system and the steam-methane reformer in the methanol system, together with the availability of imported electrical power for the oxygen plant, eliminate the need for a coal-fired boiler plant for the Keystone Project. (This results in elimination of the environmental permitting and capital investment associated with stack gas scrubbing for desulfurization); the gas quench system produces a shift feed which is saturated with water at over 300°F, resulting in a reduction of steam addition for shift converison; and a steam-methane reformer treatment of methanol loop purge gases results in a high carbon utilization and significant steam generation (in essence, the reformer doubles as a purge gas recovery unit and a steam generation plant). Aside from the economic security and stability which a synthetic fuels industry would provide to the United States, there are significant employment ramifications. Sixty plants like our Keystone Project would require 48,000 operating people, 90,000 miners and

something like 40,000 construction workers, not to mention the thousands of jobs associated with producing the hardware, structural steel, concrete and a thousand other things which would go into these plants.

43450 (CONF-8208141—, pp 501-521) **Production and market outlook for methanol in the 80's and 90's.** Stokes, C.A. (Stokes Consulting Group, Naples, FL). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The battle for markets for methanol is far from settled. At this stage, we can conclude: (1) based on the likely availability of imports at reasonable prices, the gasoline blending and neat alcohol motor fuel uses are market, not supply, limited; (2) the motor fuel market is more apt to be forced by supply of methanol at low prices than to use methanol as a result of a shortage of gasoline at reasonable price; (3) the neat motor fuel market is not apt to be significant in this decade without government stimulation or a severe upset in crude oil supply and/or price. There is likely to be ample methanol available from abroad to develop the market. It is the real McCoy market for methanol; (4) power generation use of methanol is price limited as well as limited because there is no demand in sight for new combined cycle intermediate load generating facilities; (5) for a decade or more, fuel grade methanol from natural gas should be able to compete in gasoline blending and very likely in neat motor fuel market if supply credibility at such pricing induces the auto makers finally to introduce the all-methanol car; and (6) there will be some surprises for all of us in the methanol picture. Computer market prediction programs are not able to encompass all the variables, particularly the political ones at home and abroad.

43451 (DOE/ER/10653—T1) **Thermochemical conversion of biomass to ethanol. Final report.** Hillman, M.; Allen, B.R.; Wyant, R.E.; Lipinsky, E.S.; Muralidhara, H.S.; Hayes, T.L.; Jenkins, D.M.; Huffman, W.J. (Battelle Columbus Labs., OH (USA)). 18 Feb 1983. Contract FC01-80ER10653. 179p. NTIS, PC A09/MF A01. Order Number DE83010915.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report is Battelle Columbus Laboratories (BCL) final report on a research and development program to investigate the technical and economic feasibility of a conceptual process for the production of ethanol from biomass. The concept described in this report capitalizes on carbohydrate and lactic acid chemistry but does not involve fermentation; instead of fermentation, thermochemical conversion of carbohydrates using basic metal oxides, hydroxides, and catalysts and lactate pyrolysis were investigated. The chemical approach chosen in this program, compared to conventional fermentation routes for the production of ethanol, offered the potential to: reduce reaction time from over 16 hours to 10 minutes or less; eliminate the need for sterile reaction conditions; convert pentoses as well as hexoses to ethanol; greatly reduce the volume of byproducts such as stillage; minimize energy consumption of purification by using precipitation or crystallization to remove water; and eliminate process susceptibility to trace amounts of toxic chemicals or heavy metals which significantly reduces the need for purification of feedstocks that is now required when attempting to carry out fermentation of hydrolyzed lignocellulosic substrates. The thermochemical conversion concept was evolved by Battelle Columbus personnel based upon the ethanol yield from the alkaline oxidation of cellulose that was observed during an exploratory Battelle study. Rationalization of this study, with other observations, by Battelle researchers gave rise to the concept that cellulosic or carbohydrate type biomass feedstocks could be converted via lactic acid or lactate salts to ethanol by a combination of conventional and conceptualized reaction processes.

43452 (NZERDC—90) **Fermentation studies on extracts of beet.** Smith, J.M. (New Zealand Energy Research and Development Committee, Auckland). Mar 1983. 34p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83902876.

Fodder beet juice and sugar beet juice were found to be good substrates for the production of ethanol. Two strains of floculent yeast were selected to ferment fodder beet juice and sugar beet juice. Strain CFCC 8 fermented 10% w/v sucrose-equivalent fodder beet juice well in continuous culture but was found to be adversely affected by the higher ethanol concentration during the continuous fermentation of 15% w/v sucrose-equivalent sugar beet juice. Strain ATCC 26602 was selected for the continuous fermentation of sugar beet juice. This strain had a greater tolerance to ethanol than CFCC 8 and made the efficient continuous fermentation of sugar beet juice possible. The maximum specific fermentation rate of the yeast was lower in beet juice than in a synthetic medium and it is suggested that this was caused by an inhibitory substance or substances in the beet juice. Beet juice was found to have a high level of contaminating microorganisms. Elimination of these microorganisms from the beet juice before fermentation was an essential step if high fermentation efficiencies were to be achieved. Continuous fermentation of fodder beet juice and sugar beet juice provided higher fermenter productivities than rapid batch fermentation. In a process for producing ethanol from beet it would appear that the most marked increases in efficiency are to be made in the areas of fermentation and harvesting. Under New Zealand farming conditions, it is estimated that 4000 litres of ethanol per hectare could be produced on a nation-wide basis.

43453 (SERI/STR—231-1745) **Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes.** (Chem Systems, Inc., New York (USA)). Apr 1983. Contract AC02-77CH00178. 136p. NTIS, PC A07/MF A01. Order Number DE83009108.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report presents a flow sheet for a cellulose-to-ethanol plant utilizing high-temperature dilute acid hydrolysis. The process can be divided into six sections: pretreatment, hydrolysis, fermentation, purification, carbon dioxide recovery, and heat generation and waste treatment. In the pretreatment section, the raw corn stover undergoes steam explosion, the lignin is extracted by ethanol extraction, and the amorphous five- and six-carbon sugars removed in prehydrolysis. The crystalline cellulose is hydrolyzed in the hydrolysis reactor. The sugar solution from the prehydrolysis and hydrolysis sections is neutralized and fermented to carbon dioxide and ethanol in a train of continuous fermenters. The ethanol is recovered by a distillation process, and the carbon dioxide is cleaned and liquified. The unreacted solids and various waste streams are either burned or sent to the waste pond. Capital and operating costs estimates are developed for the plant, and the total plant cost is estimated to be $236 million. The prime costs are heat generation, pretreatment, and hydrolysis. The ethanol produced costs $3.60/gal. Elimination of the lignin solvent extraction step and the prefermentation sugar concentration steps are recommended to reduce both the capital investment and energy usage of the plant. The system described in the report was not optimized. Instead it was configured to include a large number of processing steps, not all of which would be included in the same plant, in order to provide a basis for the coding of a simulation program. The ethanol costs reported are therefore much greater than would be achieved in an optimized system.

43454 (SERI/TR—231-1714) **High-temperature acid hydrolysis of cellulose for alcohol fuel production.** Wright, J.D. (Solar Energy Research Inst., Golden, CO (USA)). Apr 1983. Contract AC02-77CH00178. 80p. NTIS, PC A05/MF A01. Order Number DE83009109.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Parametric analyses of high-temperature, dilute-acid hydrolysis of cellulose were carried out to determine the effect of hydrolysis parameters and processing schemes on the selling price of ethanol, and to estimate the potential economics of such processes. Analyses were conducted using a simulation model that calculates mass and energy balances, estimates the capital cost of the plant, and determines the selling price of ethanol. All plants were designed to produce 50 million gallons per year from either a corn stover or aspen wood feedstock. The feedstock was subjected to prehydrolysis and hydrolysis to convert the cellulosic components to sugars. The sugars stream was neutralized and fermented, and

the ethanol was purified by distillation. Approximately half of the selling price of ethanol is due to capital-related charges and half to operating costs (primarily feedstock costs). The solids content of the processing streams is the most important processing parameter. Xylose fermentation has the potential to further reduce the cost of ethanol by 30%. Sales of furfural and lignin by-products could significantly reduce the selling price of ethanol if markets are available. The price of ethanol was not greatly affected by prehydrolysis, unreacted solids recycle, or small changes in hydrolysis conditions. The predicted selling price of $1.50/gallon, while subject to an uncertainty of approximately +- 30%, is of the same magnitude as that for ethanol produced from corn or petrochemical feedstocks.

43455 **Environmental characterization of corn-based fuel ethanol plants.** Mulloney, J.A. (Mueller Associates, Inc., Baltimore, MD); Hira, A.U.; Raley, D.L.; D'Alessio, G.J. pp 945-994 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

This paper presents the results of an analysis and synthesis of environmental data and information relevant to an alcohol fermentation plant employing corn as its feedstock. The plant selected for analysis was commercial scale (50,000,000 gallons/year); whole kernel milling; distillers dry grains with solubles (DDGS) byproduct; high-sulfur coalfired boilers; and a Midwest location. Each step of the process flow is described and quantified. Fifteen environmental points of interest are identified. Each environmental point of interest is analyzed in depth and quantified. Among the quantities calculated are the amounts of resources used, process flow streams, byproduct recovered, and environmental residuals associated with air emissions, liquid effluents, and solid wastes. A process flow diagram was developed and concise summary sheets presented on: 1) facility operating parameters; 2) resources used; 3) energy system description; and 4) environmental residuals and products. A total of 24 air and water pollutants and solid wastes are characterized. These environmental residuals are identified with respect to amounts generated annually, These amounts are expressed in English units, metric units, and per trillion (10^{12})Btu's of energy produced as fuel ethyl alcohol. The remaining light environmental residuals not so characterized are identified as either trace, negligible, or non-quantifiable. Occupational safety and health and personnel considerations are also reviewed.

43456 **Economic evaluation of indirect biomass liquefaction processes for production of methanol and gasoline.** Wan, E.I.; Simmons, J.A.; Price, J.D. (Science Applications, Inc., McLean, VA). pp 995-1029 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

Science Applications, Incorporated (SAI) is conducting an ongoing engineering and economic study to assess the applicability of various advanced thermochemical processes for the production of liquid fuels from biomass. This paper summarizes the technical and economic results of a comprehensive evaluation of four advanced biomass gasification processes for methanol and gasoline production. The specific gasification processes evaluated include the PNL, Winkler, SERI, and Koppers-Totzek processes. Alternative conceptual biomass-to-liquid fuel processes, using selected different process steps, were developed and analyzed for each of the advanced gasifiers. The process costs and economic sensitivities of these alternatives are compared and discussed. The results show that the non-oxygen catalytic gasification would have economic advantages over other oxygen gasification technologies. This suggests the need for further improvement and development of new catalytic gasification processes.

43457 **Uses of by-product lignins from alcohol fuel processes.** Sundstrom, D.W.; Klei, H.E. (Univ. of Connecticut, Storrs). *Biotechnology and Bioengineering Symposium;* **24**: No. 12, 45-56(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The large-scale conversion of biomass to alcohol fuels generates substantial quantities by-product lignins. The form and structure of these lignins depends upon the source of the biomass, the conversion process, and the conditions of operation. A high by-product credit for these biomass lignins significantly enhances the economics of alcohol fuels processes. The existing and potential markets for lignins can be classified into polymers, modified polymers, prepolymers, and low-molecular-weight chemicals, and fuels. Two promising large-volume applications for lignins are plywood and particle-board adhesives ad extenders for asphalt in pavement mixtures. Results of research on lignin-based adhesives and asphalts will be reported. In the case of asphalt, up to 40% of the asphalt content of mixes could be replaced by lignin without loss of stability. 8 figures, 1 table.

43458 **Fermentation of wheat straw hemicelluloses to ethanol by Pachysolen tannophilus.** Detroy, R.W.; Cunningham, R.L.; Herman, A.I. (Dept. of Agriculture, Peoria, IL). *Biotechnology and Bioengineering Symposium;* No. 12, 81-89(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Wheat straw (WS) was subjected to autohydrolysis (165°C) prior to acid hydrolysis of the xylans to yield liquor xylan solids. The crude xylan hydrolysates were tested as substrates for ethanol production by Pachysolen tannophilus. Ethanol fermentation of crude xylan hydrolysates by P. tannophilus was obtained with either ethanol- or ether-extracted material. Ethanol-extracted liquor solids yielded 10 g/L ethanol from 43 g/L xylose, whereas ether-extracted hydrolysates resulted in 4.3 g/L ethanol from 48 g/L xylose. Alkali pulping of wheat straw yielded a hemicellulose-rich fraction. Xylose was liberated by acid hydrolysis and fermentated by the yeast to produce 8.2 g/L ethanol from 47 g/L xylose in four days. 8 figures, 1 table.

43459 **Fermentation of cellulose and hemicellulose carbohydrates by thermotolerant yeasts.** McCracken, L.D.; Gong, C.S. (Purdue Univ., West Lafayette, IN). *Biotechnology and Bioengineering Symposium;* No. 12, 91-102(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Thermotolerant yeast, HT4, grows extensively in the temperature range of 30 to 45°C. This yeast also ferments glucose at a high rate in the termperature range of 30 to 50°C. When incubated in combination with Trichoderma cellulase to convert cellulose to ethanol, HT4 displays a higher rate of ethanol production at 45°C than at lower temperatures. One of the benefits of using thermotolerant yeasts, such as HT4, is that cooling problems can be simplified during large-scale fermentations. 6 figures, 3 tables.

43460 **Comparison of Candida tropicalis and Pachysolen tannophilus for conversion of xylose to ethanol.** Jeffries, T.W. (Dept. of Agriculture, Madison, WI). *Biotechnology and Bioengineering Symposium;* No. 12, 103-110(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Production of ethanol by Pachysolen tannophilus can take place under either aerobic or strictly anaerobic conditions, with Candida tropicalis ATCC 1369, the conversion requires oxygen. Although P. tannophilus generally forms ethanol in higher concentrations and under a wider range of conditions than does C. tropicalis, the specific rates of ethanol production by immobilized cells of the two organisms are similar in shake flasks (0.22 and 0.20 g/g dry wt. cells/day, respectively). P. tannophilus immobilized in a column of calcium alginate beads continuously forms up to 0.38M ethanol from 0.5M xylose for three weeks; under similar conditions, C. tropicalis escapes from the beads and clogs recirculation lines. 4 figures, 2 tables.

43461 Reactor optimization for enzymatic hydrolysis of cellulose. Lee, Y.H.; Gharpuray, M.M.; Fan, L.T. (Kansas State Univ., Manhattan). *Biotechnology and Bioengineering Symposium;* No. 12, 121-138(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Enzymatic hydrolysis of cellulose furnishes sugar which can be subsequently fermented to ethanol. The production of such sugar at relatively low cost is essential for commercially viable production of ethanol. Many processes have been developed for converting cellulosic materials to sugar, and their economic feasibility has been analyzed; however, relatively little has been done to optimize such processes. A comprehensive mechanistic kinetic model for enzymatic degradation was established previously; it takes into account the structure of cellulose, mode of action of celluloytic enzyme, and mode of interaction between the enzyme and the cellulosic substrate. In the present work this model has been applied to the optimal design of cellulose hydrloysis reactors. Both batch and continously stirred reactors have been considered for this purpose. The fractional contributions of various cost parameters to the production cost have been estimated. The sensitivity of sugar cost to the important cost parameters, such as raw material and enzyme costs, have been examined. 8 figures, 7 tables.

43462 Maximizing microbial cell loading in immobilized-cell systems. Wang, H.Y.; Lee, S.S.; Takach, Y.; Cawthon, L. (Univ. of Michigan, Ann Arbor). *Biotechnology and Bioengineering Symposium;* No. 12, 139-146(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

It has been recognized that immobilized microbial cells have several advantages over free-cell suspensions in biological processing. The major criterion of an immobilized-cell system is to maximize the cell concentration in the matrix. Leakage of cells from the polymer matrix, due to diffusion and surface matrix breakage, poses one of the major obstacles of achieving maximum cell loading. Shear, ionic strength, cell distribution within the beads, and initial cell concentrations all affect the cell leakage rate. Means to prevent or reduce this leakage are discussed in this article. 6 figures, 1 table.

43463 Use of immobilized cells of Zymomonas mobilis in a novel fluidized bioreactor to produce ethanol. Margaritis, A.; Wallace, J.B. (Univ. of Western Ontario, London). *Biotechnology and Bioengineering Symposium;* No. 12, 147-159(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

A novel 2-L fluidized bioreactor was designed and built and its performance characteristics were compared with those of an ordinary stirred-tank bioreactor. Calcium alginate beads containing immobilized cells of Zymomonas mobilis were used in both types of bioreactors to produce ethanol from glucose. The Ca-alginate beads were exposed to low shear rates inside the fluidized bioreactor and as a result the cell leakage from the beads was found to be about 100 times less than the cell leakage obtained in the mechanically stirred bioreactor. For the operating conditions studied, the fluidized bioreactor system gave at least 64% higher maximum rate of ethanol production and the power consumption per unit volume was found to be about four times less than that obtained with the mechanically stirred bioreactor. 9 figures, 1 table.

43464 Alcohol production from sugar mixtures by Pachysolen tannophilus. Neirinck, L.; Maleszka, R.; Schneider, H. (National Research Council of Canada, Ottawa). *Biotechnology and Bioengineering Symposium;* No. 12, 161-169(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The ability of P. tannophilus to produce ethanol from sugar mixtures was investigated. With mixtures simulating spent sulfite liquor and a hardboard mill effluent, yields of 76 to 84% of theoretical were obtained with a wild-type strain, which increased to 83 to 90% with a mutant selected for more rapid growth on D-galactose. A small but significant loss in yield was caused by the formation by both strains of acetate, xylitol and L-arabinitol. The loss was estimated to be in the range of 5 to 8.3% for the mutant and 7.1 to 12% for the wild-type. One conclusion drawn from these results was that the organism has the potential for use with a wide variety of hydrolysates, since the four sugars which could be efficiently fermented in the mixtures - D-mannose, D-xylose, D-glucose, and D-galactose - generally comprise more than 90% of those in polysaccharides from many biomass sources. The organism was also found to be capable of producing ethanol from, and surviving in, spent sulfite liquor. However, productivity decreased on recycling the cells, suggesting that strain improvement will be a necessary step in process development. 1 figure, 3 tables.

43465 Saccharification and ethanol fermentation of apple pomace. Miller, J.E. (Worcester Polytechnic Inst., MA); Weathers, P.J.; McConville, F.X.; Goldberg, M. *Biotechnology and Bioengineering Symposium;* No. 12, 183-191(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Apple pomace (the pulp residue from pressing apple juice) is an abundant waste product and presents an expensive disposal problem. A typical (50,000 gal. juice/day) apple juice company in central Massachusetts produces 100 tons of pomace per day. Some of it is used as pig feed, but it is poor quality feed because of its low protein content. Most of the pomace is hauled away (at a cost of $4/ton) and landfilled (at a cost of $10/ton). If 5% (w/w) conversion of pomace to ethanol could be achieved, the need for this company to purchase No. 6 fuel oil (1000 gal/day) for cooking during processing would be eliminated. Our approach was to saccharify the pomace enzymatically, and then to carry out a yeast fermentation on the hydrolysate. We chose to use enzymatic hydrolysis instead of dilute acid hydrolysis in order to minimize pH control problems both in the fermentation phase and in the residue. The only chemical studies have concerned small subfractions of apple material: for example, cell walls have been analyzed but they constitute only 1 to 2% of the fresh weight of the apple (about 15 to 30% of the pomace fraction). Therefore, our major problems were: (1) to optimize hydrolysis by enzyme mixtures, using weight loss and ultimate ethanol production as optimization criteria; (2) to optimize ethanol production from the hydrolysate by judicious choice of yeast strains and fermentation conditions; and (3) achieve these optimizations consistent with minimum processing cost and energy input. We have obtained up to 5.1% (w/w) of ethanol without saccharification. We show here that hydrolysis with high levels of enzyme can enhance ethanol yield by up to 27%, to a maximum level of 6% (w/w); however, enzyme treament may be cost-effective only a low levels, for improvement of residue compaction. 3 figures, 4 tables.

43466 Shift in metabolism towards ethanol production in Saccharomyces cerevisiae by addition of metabolic inhibitors. Hahn-Haegerdal, B.; Mattiasson, B. (Univ. of Lund, Sweden). *Biotechnology and Bioengineering Symposium;* No. 12, 193-197(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The future exploitation of fermentation processes for the production of bulk chemicals will very much depend on whether product yield and product concentration can be improved. At the present time the cost for the raw material and the product upgrading limits the competitiveness of fermentation processes in relation to petrochemical processes. Much effort is put into selecting microbial strains with higher product yields as well as improved tolerance towards increased product concentrations. This approach is rather laborious and time-consuming and the overall goal will be beneficial if it is complemented with other techniques. This investigation will describe how productivity migh be improved by addition of a specific metabolic inhibitor, sodium azide, which inhibits the cytochrome oxidase of the respiratory chain. As a model for these studies Saccaromyces cerevisiae fermenting glucose to ethanol was chosen.

43467 **Shift in metabolism towards ethanol production in Saccharomyces cerevisiae using alterations of the physical-chemical microenvironment.** Hahn-Haegerdal, B.; Larsson, M.; Mattiasson, B. (Univ. of Lund, Sweden). *Biotechnology and Bioengineering Symposium;* No. 12, 199-202(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

In the preceding communication a metabolic inhibitor was used to improve ethanol productivity in continuous glucose fermentations using immobilized Saccharomyces cerevisiae. The present study describes how this might also be achieved by altering the physical-cehmical microenvironment of the yeast cell through addition of nonmetabolizable polymers. It is suggested that the improved productivity is a result of a decreaed water activity in the growth medium. 1 figure, 1 table.

43468 **Extraction of organics from aqueous solutions using critical-fluid carbon dioxide.** de Filippi, R.P.; Moses, J.M. (Critical Fluid Systems, Inc., Cambridge, MA). *Biotechnology and Bioengineering Symposium;* No. 12, 205-219(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The recovery of ethanol from ethanol-water solutions by solvent extraction with liquid or supercritical carbon dioxide is described. Early results indicate that the process has the potential to significantly reduce the energy requirement for the separation. Pilot-plant studies were carried out using fermentation broths and synthetic ethanol solutions. 6 figures, 7 tables.

43469 **Repeated fed-batch rapid fermentation using yeast cells and activated carbon extraction system.** Lee, S.S.; Wang, H.Y. (Univ. of Michigan, Ann Arbor). *Biotechnology and Bioengineering Symposium;* No. 12, 221-231(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The application of a repeated fed-batch rapid ethanol fermentation employing immobilized yeast cells accompanied by an activated carbon extraction system has been investigated in an attempt to increase product yield. Immobilized and free yeast cells were used to effect ethanol fermentations in a simplified nitrogen-free medium containing only glucose and mineral salts. Repeatedly, fermentation broth with a high ethanol concentration (80 to 100 g/L) was extracted using activated carbon beads (BACM) and the resulting broth of low ethanol content (< 50 g/L) was recycled back for further fermentations. The maximum ethanol productivity achieved in this system was 25 g/L/h. 7 figures, 1 table.

43470 **Utilization of the fermentor off-gases from an acetone-butanol fermentation.** Moreira, A.R.; Dale, B.E.; Doremus, M.G. (Colorado State Univ., Fort Collins). *Biotechnology and Bioengineering Symposium;* No. 12, 263-277(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The off-gases from an acetone-butanol fermentation facility are composed mainly of CO_2 and H_2. Such a gas stream is an ideal candidate as a feed to a methanol synthesis plant utilizing modern technology recently developed and known as the CDH-methanol process. A detailed economic analysis for the incremental cost of a methanol synthesis plant utilizing the off-gases from an acetone-butanol fermentation indicates a profitable rate of return of 25 to 30% under the most likely production conditions. Bench-scale studies at different fermentor mixing rates indicate that the volume of gases released during the fermentation is a strong function of the agitation rate and point to a potential interaction between the volume of H_2 evolved and the levels of butanol present in the final fermented broth. Such interaction may require establishing optimum operating conditions for an integrated butanol fermentation-methanol synthesis plant. 4 figures, 7 tables.

0904 Solid Waste And Wood Fuels

43471 **(NE/FBA—82-10) Pellets as fuel. Basic properties and experience from tests in moving grate firing units.** Shuster, R.; Berge, N.; Lund, S.E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jun 1982. 133p. (In Swedish). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750766.

Portions are illegible in microfiche products.

Pellets made of wood, peat and bark have been used in the project (diameter 12 mm, ash content 0.8-2.9 per cent, density 1.1-1.2 x 10^3 kg/m^3) with the application of grate firing. To use the name pellets in general for high density fuels is not always advisable as pellets of different types show quite different combustion qualities and therefore demand different types of combustion units. Today's wood chip firing units can not, in most cases, use pellets as fuel with good results without considerable rebuilding. The advantages of pellets are: 1) The transportation and storage volumes are considerably diminished. 2) The risk of fuel blockation due to jamming or archformation is more or less eliminated. 3) Ice bound fuel stacks, self ignition of storaged fuel and bad health effects A) The feeding to the combustion chamber ought to be controlled mechanically. B) The angle of slide is different from for example wood chips. The grate slope must be modified. C) If solid fuel batches of equal weight and of equal size and shape are combusted, the relationships between the combustion time is approximately as follows: wood = 1, wood pellets = 2 and peat pellets = 3. The risk for clinker formation is increased compared to low density fuel with the same moisture content. Continuous (mechanical) ash removal is necessary in most cases. The air supply control is more critical. The bed of pellets gives high pressure drops, especially when the fuel is crumbled during transportation and in feeding mechanisms. The general know how for development of combustion units for pellets, based on the results above, exists today. The main task will be to develop cost competitive firing units with small needs of maintenance. This could be done by using conventional moving grate (bed) units as base or by developing firing units which allow heavy clinker formation (melted).

43472 **(PNL-SA—11306, pp 271-283) Development of wood as an alternative fuel for gas turbine systems.** Hamrick, J.T. (Aerospace Research Corp., Roanoke, VA). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

The key to use of wood in a gas turbine is the ability to clean the gases produced during combustion. Results from DOE sponsored research at the Coal Utilization Research Laboratories, Leatherhead, England show that large single cyclones in series can adequately clean gases produced in coal fired, pressurized, fluidized beds to avoid erosion in rows of stationary blades. A 375 kw engine was used in this program to determine if equivalent success could be achieved with a wood burning system using cyclones in the same size range but with moving blades. Operation of one engine for 210 hours and a second for 270 hours has produced no detectable erosion. Continuous sampling of the gases leaving the final cyclone showed 8 to 12 parts per million of particulates with 80 to 90 percent of the particles measuring less than 0.5 microns. The next step is to evaluate a 3000 kw system to determine cleaning effectiveness of the greatly enlarged cyclones. A system being constructed for that purpose will be installed at Red Boiling Springs, Tennessee where the cost of endurance running of the system can be partially offset by sale of power to the Tennessee Valley Authority and the low cost of sawdust. 8 figures, 1 table.

43473 **(PNL-SA—11306, pp 284-299) Biomass fueled Stirling engine combustor research.** Percival, W.H. (United Stirling Inc., Alexandria, VA); Gummesson, S.; Hansson, B. May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

This paper is a progress report on a 3 phase research program to investigate combustion of wood chips in a Stirling engine. The program objective was to achieve efficient combustion without fouling the engine heat exchanger. The Stirling cycle is described

as well as 4 engines designed by United Stirling. Four Phase III tasks are listed. Only Task 1, a literature survey, and Task 2, combustor analysis and testing, have been completed. Insufficient literature references resulted in modifying task 1 to study wood burning systems and fuel parameters, in general. These are discussed as well as the special characteristics of Stirling combustion systems. The rationale for selecting a 2 stage combustor to facilitate ash handling is explained. Under task 2 both a cyclone and a stoker type gasifier were designed and tested, for stage one. The cyclone type was tested for cold particle separating efficiency, followed by free-burning tests. Concentration of CO was 7.5 to 15 percent. Air, fuel and ash controls are discussed. The stoker gasifier involving a rotating grate is described. Initial gasification testing and parameter selection have been made. The best design will be tested with stage 2 and integrated with a model 4-95 Stirling engine in May. 7 figures.

43474 **Case study of a commercial small-scale wood-fueled steam boiler for textile mill operations.** Dixit, B.S.; Brown, M.L.; Bulpitt, W.S. (Georgia Inst. of Tech., Atlanta, GA). pp 249-265 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

This paper presents the details of a wood fired boiler demonstration study in a textile mill located in Aragon, Georgia. The wood energy system is described and the performance of the boiler with respect to its operational aspects, emissions, economics, and other items are discussed. It was observed that the boiler functioned very well during the period under study. The economics of the system are evaluated for the given conditions of steam demand, consumption, wood fuel characteristics, wood fuel costs, conventional fuel costs and other costs associated with the wood system and the previous conventional system. The results indicate that the savings from the use of wood fuel would be significant and would increase with the utilization of the wood boiler. The emissions were found to comply with applicable standards. It is observed that under favorable site specific conditions, wood energy systems would be feasible in nonforest industries.

13 HYDRO ENERGY

43475 **(DOE/RA—23215) Small-Scale Hydroelectric Power Demonstration Project: Turlock Irrigation District Drop No. 1 power plant. Final technical and construction cost report.** (Turlock Irrigation District, CA (USA)). Jan 1981. Contract FC07-79RA23215. 64p. NTIS, PC A04/MF A01. Order Number DE83015148.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report describes the major technical steps undertaken in the development of the Turlock Lake Powerhouse and identifies the considerations involved and the problems encountered during the course of the project. Covered are: site selection and operational considerations, planning, regulatory approvals, turbogenerator, construction, cost, and drawings.

1301 Resources And Availability

REFER ALSO TO CITATION(S) 43542

1303 Plant Design And Operation

43476 **(DOE/RA/23214—1) Salt River Project South Consolidated Hydroelectric Generating Station. DOE Small-Scale Hydroelectric Demonstration Program. First annual operating report, September 1, 1981 to August 31, 1982.** Bethell, L.R. (Salt River Project, Phoenix, AZ (USA)). 1982. Contract FC07-79RA23214. 43p. NTIS, PC A03/MF A01. Order Number DE83015309.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Power generation figures are presented along with a financial summary, a summary of operational problems, and monthly reports. Included in appendices are reprints of technical papers and newspaper articles. (MHR)

1305 Economics And Management

REFER ALSO TO CITATION(S) 43542

14 SOLAR ENERGY

REFER ALSO TO CITATION(S) 43835

43477 **(BEOP—1) The National Research Program Solar Energy. Project overview first phase (1978-1981).** Joon, K. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1980. 31p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

A short description is presented of 69 subjects for research development and demonstration in the field of conversion of solar energy into low-caloric heat. The 120 subjects for research form together the National Research Program Solar Energy. The program was proposed by BEOP to the Dutch minister of Economic Affairs in September 1978. The ministerial approval was obtained in December 1978.

43478 **(BEOP—2) National Research Program Solar Energy. Progress report for the period ending 30 June 1979.** Joon, K. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1980. 31p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

This report is the first in a series reporting the activities during the period covered in the National Research Program Solar Energy. Reported are activities concerning solar space heating, solar energy storage and solar boilers.

1403 Economics

REFER ALSO TO CITATION(S) 43530

43479 (CONF-800972—, pp 2.119-2.123) **Passive solar economic and market analysis.** Noll, S.A. (Los Alamos Scientific Lab., NM). 1980. NTIS, PC A16/MF A01. Contract W-7405-ENG-36.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The economic and market analysis of residential passive solar building applications is reported. Tasks of this work include: data base development, computer code development, market potential indexing, thermal and cost goals analysis, solar cities analysis, completion of the DOE Passive Solar Design Handbook, and program support. (LEW)

43480 (CONF-800972—, pp 2.124-2.127) **Overview of the regional market studies.** Klein, N. (Market Facts, Inc., Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The task discussed is to conduct market studies for each of the four Regional Solar Energy Centers. Four activities have been accomplished: a situation analysis of the market for passive solar energy, annotated bibliography for passive solar marketing, qualitative research with builders and homeowners, and the conceptualization of market studies. (LEW)

43481 (SERI/SP—741-399) **Solar energy quick reference guide.** Lornell, R.; Bryant, B. (Solar Energy Research Inst., Golden, CO (USA)). Nov 1980. Contract AC02-77CH00178. 44p. NTIS, PC A03/MF A01. Order Number DE83014245.

The Solar Energy Quick Reference Guide attempts to partially meet the needs of solar professionals and policy makers. Its primary purpose is to present cost and performance data from eight solar technologies: active heating and cooling, passive design, industrial process heat, biomass, wind, photovoltaics, ocean thermal energy conversion, and solar thermal electric. Chapter 2 defines the various kinds of costs presented. It also discusses the myriad factors in computing a very accurate cost - factors that are omitted in this guidebook because its purpose is to allow rough, easily computed cost comparisons. Chapter 3 consists of eight sections. Each section begins with performance and cost equations for that technology, presents tables containing performance and cost data, gives sample calculations using the equations and data, and concludes with rules of thumb on factors such as land use. Numerous examples are given of the cost and performance of each technology, in effect presenting ranges. Chapter 4 presents four tables to aid the analyst in using the data and equations found in Chapter 3. These tables present capital recovery factors, insolation data useful for active and passive systems, and price deflators which allow the reader to compare costs given in different-year dollars. A secondary purpose of the guide is to present solar and nonsolar energy-related data that are often needed by policymakers and solar professionals. Thus the fifth chapter includes tables on such subjects as square feet of collectors sold over the last few years, the federal solar budget, and prices for conventional fuels. The concluding chapter lists conversion factors useful in the solar field: e.g., Btus to kilowatt-hours.

1404 Environmental, Legal, And Institutional Aspects

REFER ALSO TO CITATION(S) 43497, 43532, 43588, 43619, 43620

43482 (CONF-800972—, pp 1.1-1.6) **New directions in the US solar heating and cooling program.** Morse, F.H. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Examples are given of the way the solar applications program operates, and the program's local-level achievements throughout the United States are indicated. Some highlights of the history of the national solar energy program since 1971 are reviewed. The need for a DOE solar program is then explained and its direction described. (LEW)

43483 (CONF-800972—, pp 1.12) **Passive solar industry.** Jordan, D.R. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The passive industry is maturing. The passive program must focus its efforts on activities that strengthen passive's market position and facilitate sales by the industry.

43484 (CONF-800972—, pp 2.117-2.118) **Development and implementation of passive solar information/promotion plan.** 1980. NTIS, PC A16/MF A01. Contract AC02-77CH00178.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A promotion/public information campaign will be conducted to promote awareness of passive solar concepts and the use of passive solar energy techniques among key audiences within the general public. In fulfilling this objective, public relations activities will be conducted directly with consumers groups, civic and community groups, realtors, lenders, prospective home buyers, and other groups aside from the building products and construction industries.

43485 (CONF-800972—, pp 2.131-2.132) **Building supplier as energy information center.** Knight, P.A. (Northeast Solar Energy Center, Boston, MA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of the efforts reported is to develop the potential of the building supplier as an effective merchandiser of passive solar materials and as a credible energy information center within the community. The key accomplishment was a series of seminars which introduced passive solar concepts to over 700 members of the Northeastern Retail Lumbermen's Association (NRLA). A demonstration sunspace was built and is displayed at an NRLA lumberyard. Technical and merchandising support is also given to several individual lumber dealers embarking on energy programs. (LEW)

43486 (CONF-800972—, pp 4.37-4.38) **Passive Solar Industries Council.** Johnston, D.R. (Potomac Energy Group, Inc., Alexandria, VA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Passive Solar Industries Council is a federation of over forty trade associations, professional groups and labor unions representing virtually every aspect of the home building industry. It was organized to facilitate communication both within the construction industry and between industry and government. With a goal of accelerating the development and acceptance of passive solar technology and products. Council membership includes groups representing builders, architects, engineers, remodelers, product manufacturers, material suppliers, lumber dealers, building owners, managers and researchers. Members are currently involved in a wide range of activities, including workshops and training seminars, design tool development, contributing to the Solar Action Week program, sponsoring the conference for builders and remodelers in Amherst, and supporting legislative initiatives to boost passive solar.

43487 (CONF-800972—, pp 5.1-5.4) **Solar Cities and Towns Program.** DeSerio, F. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

This paper provides an overview of the Department of Energy's new Solar Cities and Towns Program. Its focus is on those renewable energy technology and design approaches which benefit from large scale, multiple-building applications. Such projects are facilitated by urban densities within single municipal jurisdictions. Its initial emphasis is on passive and hybrid solar commercial and multifamily applications. Funding will be provided for developers and cooperatives functioning as developers. Allowable costs include feasibility and design studies, management, communication, and education by the developer of local government and financial sector officials and policy development by those officials. Education and implementation materials supporting these tasks will be developed from existing publications and consolidated into Town Kits. Under DOE enhanced budget options, cost sharing of construction costs will also be provided. Examples of selected projects are included. Regional Solar Energy Centers will also fund technical and policy implementation assistance to municipalities whose policy impacts such developers.

43488 (CONF-800972—, pp 5.5-5.8) **Massachusetts Local Energy Action Program.** Miller, M. (Arrowstreet Inc., Cambridge, MA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Massachusetts Local Energy Action Program (LEAP) is designed to help communities plan, implement and manage local energy programs. This is accomplished through the organization of supportive statewide structures, and development and dissemination of appropriate planning and technical assistance documents. We organized a task force to oversee LEAP, establishing a unique politi-

cal coordination for both the development and implementation of LEAP, with on-going roles for diverse governmental entities. We also helped organize the Association of Massachusetts Local Energy Officials, as a forum for interchange and coordination between community energy representatives and a unified voice on local energy action issues. The LEAP assistance documents include an Executive Summary and four technical manuals: (1) Organizing and Planning; (2) Local Actions Catalog; (3) Case Histories; and (4) Funding and Assistance sources. These provide detailed, step-by-step guidance on community organizing and energy planning processes, possible energy actions to consider, and potential agency and program resources. The planning approach emphasizes Staged Action - reflecting the need for immediate results and allocation of efforts appropriate to realistic implementation time-frames. The local energy action programs concern all sectors - not only municipal, but residential, commercial, industrial, institutional and transportation - and require involvement of representatives of all these interested parties in planning, for which alternative structures are suggested. LEAP stresses the importance of the priority commitment of the local Chief Executive to the energy program, and the central role of the Energy Coordinator for successful local action.

43489 (CONF-800972—, pp 5.9-5.11) **Philadelphia Solar Planning Project.** Burnette, C. (Charles Burnette Associates, Philadelphia, PA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Philadelphia Solar Planning Project is a comprehensive interdisciplinary effort the objectives of which are to inventory, analyze, assess and assist the implementation of conservation and solar applications in Philadelphia. As such it is the pilot project for the emerging Solar In Cities and Towns Program in the Conservation and Solar Applications Division of DOE and a direct outcome of the Solar Division of DOE and a direct outcome of the Solar Energy for Cities session at the Second Passive Conference in Philadelphia. Having produced 15 working papers, a conference and other initiatives, the current focus of the project is on implementation through policy, program and project development at the levels of municipal government and neighborhood organizations. Five residential demonstrations, the development of program models for the city's small business assistance and industrial development corporations, and market development efforts for rental housing and neighborhood scale applications are underway. A related Passive Commercial Demonstration project is nearing construction.

1405 Solar Energy Conversion

REFER ALSO TO CITATION(S) 43266, 43418, 43419, 43421, 43422, 43425, 43426, 43427, 43428, 43429, 43430, 43431, 43432, 43433, 43435, 43436, 43437, 43438, 43439, 43440, 43441, 43442, 43443, 43444, 43445, 43446, 43447, 43451, 43452, 43453, 43454, 43455, 43456, 43457, 43458, 43459, 43460, 43461, 43462, 43463, 43464, 43465, 43466, 43467, 43469, 43470, 43471, 43472, 43473, 43474, 43536, 43646, 44052, 44059, 44323, 44356, 44782, 44783, 44784

43490 **(BMFT-FB-T—83-081) Development and testing of a submersible motor pump driven by a solar cell generator.** Picmaus, E.; Fleckenstein, V. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). May 1983. 35p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751045.

In applications of submersible motor pumps driven by solar cell power supply systems, the total system efficiency is most important. The pump and motor efficiency of a submersible motor pump of series standard could be improved for each 10 points, using an asynchronous motor similar to series. The investigation of synchronous motors and brushless DC-motors proved no economical result. To convert the DC-current delivered by solar cells into AC-current of variable frequency and voltage, a pulse converter with MOS power transistors (SIPMOS) was developed, further a control device considering the special demand of operation with solar cells. It consists of an on-off automatic device and a maximum power point control device. For testing the single components and the total system, a testing supply has been installed. As a result a total efficiency of 43% at nominal load and of 33% at 1/4 load was determined.

43491 **(DOE/CE—0033-1) Photovoltaic energy systems. Program summary, fiscal year 1982.** (Solar Energy Research Inst., Golden, CO (USA); Jet Propulsion Lab., Pasadena, CA (USA)). Apr 1983. Contract AC02-77CH00178;AI01-76ET20356. 427p. NTIS, PC A19/MF A01. Order Number DE83014927.

Government-sponsored activities within the Photovoltaics Program are summarized. Ongoing research development, and demonstration efforts are highlighted, and each of the US Department of Energy's current photovoltaic projects initiated, renewed, or completed during fiscal year 1982 are described. Directing organizations are listed, the individual contracts are summarized, and publications for the year are listed. (LEW)

43492 **(DOE/ET/20218—T1) Improved semiconductors for photovoltaic solar cells. Final report, July 15, 1977-July 14, 1978.** (Monosolar, Inc., Santa Monica, CA (USA)). Oct 1977. Contract AC01-76ET20218. 16p. NTIS, PC A02/MF A01. Order Number DE83015057.

Portions are illegible in microfiche products.

During the year of work being reported upon, Monosolar and its subcontractor, the University of Southern California, were successful in demonstrating an operable solar cell made by electrodeposition of the compound semiconductor CdTe on a sheet of ITO-coated soda glass. The best of the various configurations tested was the heterojunction soda glass substrate/n-In_2O_3:Sn/p-CdTe:As/p-Te/Ag. At 79 mW/cm^2 illumination from a solar simulator, and also in bright sunlight, typical values for V/sub oc/ were 0.48 V, while J/sub sc/ values of 7 mA/cm^2 were achieved. Fill factor was poor and never exceeded 0.4. Careful study of the cell structures indicates by increasing the present thickness of CdTe from its typical value of 0.2 micron that substantial increases will be obtained in both J/sub sc/ and efficiency. This will come about by our improving the optical absorption to its proper level. Further, present grains measure 0.2 microns when plated at 90°C. Larger grains made by alternative techniques at higher temperatures awaiting refinement should further improve efficiency. The Monosolar plating process is extremely simple and is performed in very inexpensive apparatus. Reagent grade chemicals are suitable as they are electrolytically purified before use.

43493 **(DOE/ET/20597—T11) First three years of the Department of Energy Grant. Final report.** Walbridge, T.A. Jr.; Stuart, W.B. (Virginia Polytechnic Inst. and State Univ., Blacksburg (USA). Dept. of Forestry). [nd]. Contract FG01-78ET20597. 438p. NTIS, PC A19/MF A01. Order Number DE83008706.

Portions are illegible in microfiche products.

The research described in this report focuses on potential of integrating the production of wood for energy into the existing forest products supply system. This system has proven capable of supplying the approximately 200 million tons of wood required annually by the lumber and pulp industry. Expanding and refining this system to include wood for energy offers the best promise for realizing the potential of the existing wood resource for energy in the immediate future. Discussion is presented under the headings: field drying; influence of moisture content and species; energy requirement for chipping; in-woods transport; in-woods processing; transportation; modeling of harvesting machines and systems; development of on in-situ stand generator for use in harvesting machine simulators; analysis of economic feasibility of harvesting forest residues for energy and the implications for forest management; in-plant receiving, storing, and preparation of woody fuels; and development of harvesting systems. (DMC)

43494 **(DOE/JPL/955567—83-11) Design, analysis, and test verification of advanced encapsulation systems. Triannual report for period ending 31 March 1983.** Garcia, A. III; Kallis, J.M.; Trucker, D.C. (Spectrolab, Inc., Sylmar, CA (USA)). Jun 1983. Contract NAS-7-100-955567. 48p. NTIS, PC A03/MF A01. Order Number DE83015463.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Construction of several full size qualification modules using polyurethane encapsulant and a Tedlar front cover is discussed. In addition, an electrical isolation analysis is reported which was to

develop a method for evaluating the multi-dimensional effects of the modular conductor geometry on the electric field. The multi-dimensional electric field was calculated with a finite-element-based code using the analogy between thermal and electrostatic fields. (LEW)

43495 **(DOE/JPL/955909—83/10) Process research of non-CZ silicon material. Low-cost solar-array project: cell and module formation research area. Quarterly report No. 5, March 1, 1983-May 31, 1983.** (Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Energy Systems Div.). 1983. Contract NAS-7-100-955909. 33p. (WAESD-TR—83-1005). NTIS, PC A03/MF A01. Order Number DE83014438.

This report describes work performed on Process Research of Non-CZ Silicon Material during the quarterly period from March 1, 1983 to May 31, 1983. Technical work this period emphasized preparing the front surface N^+P junction using a phosphorus containing liquid as a diffusant source. These tests have been carried out on hand coated samples using a sponge-squeegee as well as on samples coated using the meniscus coater. Other studies were carried out on a series of liquid boron diffusant sources and liquid mask solutions. In addition to the liquid dopant studies, an evaluation was carried out on a vendor supplied pelletized silicon material. This material was evaluated to determine if it could replace the polycrystalline silicon pellets prepared in the shot tower. Additional dendritic web was supplied for ion implantation studies.

43496 **(DOE/JPL/956205—83/4) Development of metallization process: FSA project, cell and module formation research area. Quarterly technical progress report No. 6329-12 for the period ending March 31, 1983.** Garcia, A. III. (Spectrolab, Inc., Sylmar, CA (USA)). May 1983. Contract NAS-7-100-956205. 16p. NTIS, PC A02/MF A01. Order Number DE83015172.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The use of CO in place of H_2 for the reducing step did not appreciably increase solderability of interconnects. Cells were also made printing the pastes on top of ITO coatings. Some of these cells were the best electrically but the metallization was still not adhering. Sequential use of H_2 and CO had no effect on adhesion (or lack of it).

43497 (EPRI-AP—2884-SR, pp 5.15-5.19) **Photovoltaic status assessment: government perspective.** Prince, M.B. (US Department of Energy, Washington, DC). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Two questions are addressed - what is the government's perception of the current status of photovoltaic technology, and what is the government's responsibility in the further development of the technology. (LEW)

43498 (EPRI-AP—2884-SR, pp 5.21-5.27) **Photovoltaic cell and module status.** Harrison, J.W. (Research Triangle Inst., Research Triangle Park, NC). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The performance, as measured by the electrical conversion efficiency under standard conditions, and the reliability aspects of photovoltaic cells made from silicon, gallium arsenide, and cadmium sulfide are briefly surveyed. Stages of component development are discussed, and the factors that were used to provide a performance comparison and a development status rating for photovoltaic cells and modules are listed. (LEW)

43499 (EPRI-AP—2884-SR, pp 5.47-5.49) **Photovoltaic status assessment: utility perspective .** Weinberg, C. (Pacific Gas and Electric Co., San Ramon, CA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Involvement of the Pacific Gas and Electric Company in photovoltaic activities is reported. Included is support of research in a dendritic web process. A module test facility, an automated I-V curve test system, tracking systems for flat plate modules, and a solar concentrator used for evaluating cells and system concepts are described. Efforts to collect insolation data are briefly discussed. (LEW)

43500 **(EUR—8199-EN) AMOS solar cells on polycrystalline gallium arsenide. Final report.** McEvoy, A.J.; Wrixon, G.T. (University Coll., Cork (Ireland). Microelectronics Research Centre). 1983. 46p. European Community Information Service (ECIS), 2100 M Street NW, Suite 707, Washington, DC 20037.

Material growth, analysis and properties of thin-film gallium arsenide are discussed, particularly the status of sputtering and plasma synthesis. Fabrication of solar cells on polycrystalline and thin-film gallium arsenide substrates is reported, and oxide interlayers and passivation are assessed. Appended are papers on plasma synthesis and ESCA/UPS analysis of gallium arsenide, grain boundary oxidation and efficiency of gallium arsenide polycrystalline photovoltaic devices, discharge suppression within piezoelectric gas admission values, and sputter growth and XPS/ESCA of an indium selenide thin film. (LEW)

43501 **(LBL—16131) Mathematical modeling and optimization of liquid-junction photovoltaic cells.** Orazem, M.E. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 299p. NTIS, PC A13/MF A01. Order Number DE83014966.

Portions are illegible in microfiche products; Thesis.

The objective of the work reported was to develop a mathematical model of the liquid-junction photoelectrochemical cell which could predict the effect of design parameters on cell performance. The one-dimensional model of the liquid-junction cell was coupled with primary resistance calculations to predict the effect of cell design on performance. The one-dimensional mathematical model treats explicitly the semiconductor, the electrolyte, and the semiconductor-electrolyte interface in terms of potentials and concentrations of charged species. The design and optimization of photoelectrochemical cells is presented, followed by the primary resistance calculations for two designs. Concepts of potential in electrochemical systems are discussed, and the equilibrated semiconductor is described. Experimental methods for characterization of photoelectrochemical cells are reviewed. (LEW)

43502 **(NE-SBT—81-31) Sour felling.** Liss, J.E. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). [nd]. 31p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750771.

Portions are illegible in microfiche products.

The method of drying birch firewood by letting the tree stay untrimmed during the growing season after having felled the tree has come into use again also for conifers. The drying is accelerated by transpiration via leaves and needles. The best time for sour felling of conifers in Sweden is May to September. Spruce, birch and alder trees are suited for sour felling. Conifers should be felled after the insects have finished their swarming. The tests which were performed in the summer of 1978 showed that birch tree could be dried to a moisture content of 30 per cent by sour felling. The size of the stem and the crown is of no big importance to the drying procedure. The sour felled trees dried considerably faster than the processed timber. The conclusions are preliminary.

43503 **(NE-SBT—82-31) Growth of mold in fuel chips.** Stroemquist, L.H. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1982. 31p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750772.

Portions are illegible in microfiche products.

Birch trees, including branches and leaves, were cut down in spring, left to dry in order to reduce the water content and then chipped and dried in a drum dryer to a moisture content of 12 per cent, 18 per cent and 22 per cent respectively. The different chip quantities, each of at least 30 m^3, including non-treated raw chips, were stored partly in closed boxes and partly under pent-roofs. The content of air-borne mold fungi at the different chip piles was determined during a period of totally seven weeks. At the same time

the normal content of mold spores in the area was measured. Temperature and CO_2-content were also registred at the different chip piles. The results show that it is difficult to prevent mold growth in chips. The best treatment proved to be drying to a moisture content of 12 per cent, hereby exposing the chips to the high temperature for the longest period of time. In this chip quantity no mold growth during the time of the experiment could be detected. Neither could any CO_2-content be traced. In spite of this fact the actual amount of mold in this quantity proved to be far above the tolerable level. In the other chip piles an increase in temperature was registered during the first month. Parallel to this increase in temperature a considerable mould growth, which culminated after about two weeks, was noted. After this the content of mould stayed constant during the rest of the experiment. The CO_2-content in this part of the experiment increased during the first week to an optimum of about 4 per cent. After this it gradually decreased to 0.5 per cent or less, after eight weeks. In order that relevant measures may be taken against mold growth in wooden chips, a better knowledge of growth and life conditions of mold sponges is required. Not until this knowledge is obtained, can methods with optimal effect be developed.

43504 **(NILU-OR—26/81) Occurrence of fungus spores in chip combustion and storage installations. II.** Hoeg, H.I. (Norsk Inst. for Luftforskning, Kjeller). Apr 1981. 17p. (In Norwegian, English). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750850.

Two Burkard pollen traps were used near three small chip firing installations, during the period Dec 1980 to Jan 1981, to identify and quantify fungus spores in the air around the installations, in an adjoining farmyard, and in the living quarters. Only a few types of spores were identified, but the spores occurred in vast amounts, especially when the chips were transported from the chip storage room to the boiler room. This resulted in high spore concentrations in chip storage rooms and boiler rooms. At one location high concentrations were also found in the living quarters. 7 tables.

43505 **(NP—3902919) Electrical performance subgroup standards development. Final report.** (Arizona State Univ., Tempe (USA). Coll. of Engineering and Applied Sciences). [nd]. 64p. College of Engineering and Applied Sciences, Arizona State Univ., Tempe, AZ 85287.

Photovoltaic test standards are summarized, indicating important points of debate during the development of the method, along with a description of developments which occurred after the method was finalized. Methods discussed include: electrical performance test for concentrator solar cells; electrical and thermal performance test for actively-cooled concentrator modules; outdoor electrical performance testing of passively-cooled concentrator modules in sunlight; off-axis electrical performance of concentrator modules; optical performance of refractive concentrators; and optical performance of reflective concentrators. (LEW)

43506 (PNL-SA—11306, pp 7-13) **On-farm biomass program.** Butler, J.L. (ARS Southern Agricultural Energy Center, Tifton, GA). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Biomass has a very low energy density when compared with fossil fuels, especially petroleum. Because of this, the distance which it can be transported is limited unless some kind of conversion is made. Research now being conducted is aimed toward conversion as near the point of production as possible for biomass in the form of crop residue, wood, crops produced specifically for energy and for liquid fuels. The applications of these energy conversions range from crop drying and space heating through the production of liquid fuels and the feeding of farm produced electricity into the public utility grid. The findings of this research should make our food production system less vulnerable to disruption in fuel supply and should give our producers another market for their products, either directly or by substituting for purchased energy.

43507 (PNL-SA—11306, pp 257-270) **Assessment of potential wood supply for intermediate scale thermoconversion facilities.** Orr, F.E. (PYROS, Inc., Gaithersburg, MD). May 1983. NTIS, PC A21/MF A01. (CONF-830323—).

From 15. biomass thermochemical conversion contractor's meeting; Atlanta, GA, USA (16 Mar 1983).

Despite the large quantity of forest biomass in the nation, availability for energy use will be constrained by several factors. A recent study of wood supply for the northeast region identified several factors that will limit supply. These factors vary in importance when examined at the sub-regional level and in some situations can be expected to increase in importance with the passage of time. The most obvious factor with respect to limiting supply is the size of the resource base available to grow biomass and what is happening to that base. In several of the states, urbanization has severely reduced the amount of forestland and further reductions can be expected. In many of the urbanized states, the resource base has been fractured into smaller and smaller units resulting in parcels uneconomical to manage. Terrain limitations on the use of current harvesting technology will also act to limit supplies. 4 tables.

43508 **(SERI/TP—211-1952) Review of research on polycrystalline-silicon solar cells.** Milstein, J.B.; Tsuo, Y.S. (Solar Energy Research Inst., Golden, CO (USA)). Jun 1983. Contract AC02-77CH00178. 14p. (CONF-830420—4). NTIS, PC A02/MF A01. Order Number DE83011978.

From Society of Photo-Optical Instrumentatio.. Engineers conference; Arlington, VA, USA (4 Apr 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This paper reviews recent results obtained in the polycrystalline silicon solar cell task area at the Solar Energy Research Institute (SERI) and presents a description of the goals which are expected to be achieved in the next year and beyond.

43509 **(SERI/TP—212-1970) Simplified contacting scheme for GaAs solar cells using silver.** Hogan, S.; Firor, K. (Solar Energy Research Inst., Golden, CO (USA); Pacific Gas and Electric Co., San Ramon, CA (USA)). May 1983. Contract AC02-77CH00178. 11p. (CONF-830508—24). NTIS, PC A02/MF A01. Order Number DE83011977.

From 163. Electrochemical Society meeting; San Francisco, CA, USA (8 May 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The conventional contact process for GaAs/GaAlAs photovoltaic devices uses Au alloys to form ohmic contacts. We have studied the properties of evaporated Ag contacts onto epitaxial GaAs and found that by adjusting certain process parameters, the contact properties become ohmic on both n- and p-type materials. Various parameters (including contact resistance, series resistivity, and all I-V parameters) are compared for both Au alloy systems and Ag contacts, and found to be equivalent. Auger analysis of the GaAs/metal contacts interface is also presented.

43510 **(SI-R—810314-1) Chemical characterization of emissions from wood-fired stoves.** Ramdahl, T. (Sentralinstitutt for Industriell Forskning, Oslo (Norway)). Sep 1981. 32p. (In Norwegian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750847.

Portions are illegible in microfiche products.

Chemical analysis of the flue gases from combustion of wood in a typical Norwegian stove has been performed in addition to measurements of other parameters: CO, CO_2, CH_4, NOsub(x), particles and temperature. Measurements were performed using spruce and birch with two different test procedures: 1) intense firing having high intake of air and high combustion temperature; continous firing at low intake of air and low combustion temperature. Type of wood had little influence on the compounds formed and strength of emissions. Continuous firing gave higher emissions of organic compounds than intense firing. Benzene, formaldehyde and polycyclic hydrocarbons (PAH) were found in the following quantities (given per kg dry wood): 68 - 1290 mg benzene/kg, 40 - 1700 mg formaldehyde/kg and 2.6 - 32.3 mg PAH/kg. 8 drawings, 8 tables.

43511 **(UCLA-ENG—83-21) Semiconductor eutectics for energy conversion. Final report.** Yue, A.S. (California Univ., Los Angeles (USA). School of Engineering and Applied Science). Apr 1983. Contract AT03-76ER70259. 105p. NTIS, PC A06/MF A01. Order Number DE83014940.

Directionally-oriented two-phase semiconducting eutectics are potential device-materials. A comprehensive search of the literature gives a list of semiconducting eutectic systems. Among these, the SnSe-$SnSe_2$ was chosen for studies in detail. The SnSe-$SnSe_2$ eutectic grown by the Bridgman technique has a multi-P/N-junction lamellar microstructure. Since its plasma frequency has not been detected within the infrared reflectance spectrum up to 40 micrometers of wavelength, it is, therefore, concluded that the SnSe-$SnSe_2$ eutectic is a non-degenerate semiconductor. SnSe single crystals grown from the vapor phase has a hole concentration of 9.72 x 10^{17} cm^{-3} and a mobility of 154 cm^2/sec-v at room temperature. This mobility is proportional to T/sup -1/3/ for T < 130°K and T/sup -2.25/ for T > 130°K. The index of reflection for SnSe single crystal has been determined from a wavelength of 3 micrometers to a wavelength of 40 micrometers and was found to be 3.120 at 3 microns and 3.095 at 15 microns. A current-voltage characteristic expressed as $I = I_0 \exp(qv/2.08\ KT)$ was measured on a SnSe diode, which exhibits a negative resistance after the breakdown. An indirect band gap of 0.922 eV was obtained from the photoresponse measurement on a SnSe diode which is consistent with a value of 0.923 eV, obtained from the optical absorption measurement of thin SeSn wafers. $SnSe_2$ and SnSe films have been successfully deposited on a SnSe and $SnSe_2$ substrate forming a P-N junction by the close-space-vapor-transport technique. Since both the open-circuit voltage and the short-circuit current, measured from photodiodes made of these materials were small (V/sub oc/ = 0.05 Volts and I/sub sc/ = 5 mA for a $SnSe_2$/SnSe solar cell; V/sub oc/ = 0.11 Volts and I/sub sc/ = 14 mA for a Schottky diode), no effort has been made to calculate the solar-cell efficiency.

43512 **Glass diffusion source for constraining BSF region of a solar cell.** Lesk, I.A.; Pryor, R.A.; Coleman, M.G. US Patent Application 6-412,417. 27 Aug 1982. 12p. Contract NAS-7-100-954874.

The present invention is directed to a method of fabricating a solar cell comprising simultaneous diffusion of the p and n dopant materials into the solar cell substrate. The simultaneous diffusion process is preceded by deposition of a capping layer impervious to doping by thermal diffusion processes.

43513 **The economics of hardwood fuels produced on biomass plantations.** Dolan, L.S. (Seattle City Light, WA); Kropp, F.; Sims, G. pp 63-107 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—). Contract FG01-78ET20593.

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

Seattle City Light has conducted hardwood plantation research since 1978, investigating the feasibility of fastgrowth cottonwood and alder plantations to supply fuel for electric generation under a U.S. Department of Energy grant. Two experimental plantations have been operated for three years to determine productivity and optimal management programs. An assessment is made of the cost of fuel produced on these biomass plantations, as well as a scenario that relies on harvest of existing red alder stands. Included in the assessment are: an evaluation of forest plantation equipment availability; feasibility and cost; land availability and cost in western Washington; environmental effects of intensive culture short-rotation plantations and associated mitigation; and a survey of alternative woody fuel use and dollar value by Northwest forest industries.

43514 **Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops.** Shen, S.Y.; Nelson, C.H. (Argonne National Lab., Argonne, IL). pp 1145-1160 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

The economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops is discussed and the results of two simulations are reported. The land use data of the 1980 National Agricultural Lands Study provided input for assessing land availability for short-rotation forestry and other terrestrial biomass production. The POLYSIM model and the Colorado State University beef model were used to simulate the effects of decreased acreage for food crops and livestock because of biomass plantations on the economics of raising livestock and producing agricultural crops. When grazing land is displaced for energy crop production, more feed grain is fed per head of livestock, resulting in higher energy intensity in the livestock sector. When cropland is displaced for energy crop production, current market forces indicate that the initial impact is largest on feed grain supply, next largest on food crop exports, and least on domestic food supplies.

43515 **Potential for chemicals from biomass.** Donaldson, T.L.; Culberson, O.L. (Oak Ridge National Lab., Oak Ridge, TN 37830). pp 1205-1225 of Symposium papers: energy from biomass and wastes VI. Feingold, B.W.; Courtney, L. (eds.). Chicago, IL; Institute of Gas Technology (Jun 1982). (CONF-820127—).

From 6. annual conference on energy from biomass wastes VI; Lake Buena Vista, FL, USA (25 Jan 1982).

The potential for producing chemicals from biomass in the United States is being evaluated using two tools. The first is a Delphi-type study of the major issues governing large-scale production of chemicals from biomass, including biomass feedstock, product slates, preferred processing routes, and chemicals from coal. Over 50 recognized biomass authorities participated in this study. The results discussed will be of major interest to people doing biomass research and development (R&D) and planning commercial ventures. The second tool is a systems model of a hypothetical future chemicals-from-biomass industry based on a linear programming algorithm. Given limited supplies of biomass and hydrocarbon feedstocks, what are the best chemicals to produce, and by what processing routes? Or, given a market demand, what are the most effective processing routes and what are the best feedstocks for producing these chemicals from biomass? What new processes are needed, with what characteristics? A variety of scenarios can be explored using the systems model. Various feedstocks (including oil and coal), advanced and conceptual processing routes, and product slates can be examined. Areas in which R&D would be especially beneficial are highlighted.

43516 **Freeze-explosion technique for increasing cellulose hydrolysis.** Dale, B.E.; Moreira, M.J. (Colorado State Univ., Fort Collins). *Biotechnology and Bioengineering Symposium;* No. 12, 31-43(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

A novel pretreatment has been developed to increase the reactivity of cellulose, in particular to increase the rate and extent of cellulose hydrolysis. This technique is called the freeze-explosion method and relies on treatment of the cellulosic material with a volatile liquid under pressure followed by pressure release to evaporate the liquid and reduce the temperature. Volatile liquids which also chemically swell and decrystallize cellulose are particularly effective when used in this method. Greater than 90% of theoretical conversion of cellulose to glucose has been achieved by enzymatic hydrolysis of alfalfa and rise straw treated with liquid ammonia using this freeze-explosion technique. 8 tables.

43517 **Enzymatic hydrolysis of cellulose pretreated with zinc chloride and hydrochloric acid.** Chen, L.F.; Gong, C.S. (Purdue Univ., West Lafayette, IN). *Biotechnology and Bioengineering Symposium;* No. 12, 57-65(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Microcrystalline cellulose, Avicel, was dissolved in a concentrated solution of $ZnCl_2$ and 0.5% hydrochloric acid followed by heating at 145°C for 6 min. after cooling, cellulose in its amorphous form was precipitated by the addition of acetone. The resulting cellulose was hydrolyzed by cellulase derived from Tricho-

derma viride. At concentrations of 20% cellulose and 1% cellulase, cellulose was hydrolyzed completely for form a solution of 19% glucose and 1% cellobiose within 72 h of incubation. 1 figure, 5 tables.

43518 **Production of organic acids from biomass by acid hydrolysis and fermentation.** Clausen, E.C.; Shah, R.B.; Najafpour, G.; Gaddy, J.L. (Univ. of Arkansas, Fayetteville). *Biotechnology and Bioengineering Symposium;* No. 12, 67-72(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Biomass is one alternative raw material that is plentiful and can be used in both energy and chemical production. Microorganisms utilize a wide variety of substrates, and some convert both hexoses and pentoses, available from hydrolysis of biomass. Production of petrochemicals from biomass represents a potential alternative to petroleum processing. Results of this study showed that Propioni-bacterium acidi-propionici produce organic acids from a mixture of xylose and glucose without inhibition. The rate equations developed show glucose fermentation to be about ten times faster than xylase fermentation at low concentrations. Good yields and greater than 80% conversion of both glucose and xylose are achieved with retention times of ca. 2.5 days. Process economic projections show that the cost of a mixture of propionic and acetic acids produced by fermentation of the acid hydrolysates of crop materials is surprisingly low, less than one-quarter of the present market value. 1 figure, 1 table. (DP)

43519 **Effect of γ-ray irradiation on sugar production from plant biomass.** Han, Y.W.; Ciegler, A. (Southern Regional Research Center, New Orleans, LA). *Biotechnology and Bioengineering Symposium;* No. 12, 73-77(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

During the past several years, evidence has indicated the effectiveness of gamma radiation in altering lignocellulosic polymers to enhance their susceptibility to chemical and enzymatic attack. Reassessment of high-energy radiation as a tool in reducing the use of fossil fuel suggested that the procedure might have practical value in modification of lignocellulosics prior to hydrolysis to sugars for use in fermentation. Select combinations of chemical pretreatment and gamma radiation can also lead to production of feedstocks useful to the chemical synthesis industry. Preliminary research indicated that the properties of lignocellulosics are changed and a variety of compounds are produced by gamma irradiation. In general, gamma irradiation of lignocellulosics such as wood, paper, and crop residues causes depolymerization of biopolymers and decomposition of carbohydrates at dosages between 10 and 100 Mrad, and the resulting materials shows a loss of crystallinity and increase in digestibility by subsequent hydrolysis by acid and enzymes. These changes may be advantageously used for production of energy from biomass. Large quantities of gamma-emitting ^{137}Cs are found in fission-product wastes stored since the initiation of ^{239}Pu production during World War II. The task of disposing of the radioactive wastes produced by nuclear power plants is often cited as one of the principal drawbacks to the use of nuclear fission for electric power generation. 1 figure, 3 tables.

43520 **Growth and citirc-acid production by Candida guilliermondii using a cellulose substrate.** Asenjo, J.A.; Szuhay, J.; Chiu, D. (Columbia Univ., New York, NY). *Biotechnology and Bioengineering Symposium;* No. 12, 111-120(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Growth and citric-acid production by Candida guilliermondii were studied first on glucose and then on an enzymatic hydrolysate of Solka Floc. Sequential and simultaneous saccharification and fermentation have been carried out. The production of citric acid was increased by limiting the level of nitrogen in the media and thus controlling growth. The direct bioconversion (simultaneous process), which is expected to circumvent end-product inhibition of the saccharification, gave a threefold increase in the yield of biomass but not substantial effect on the production of citrate was observed. The behavior of the Candida cells as well as fermentation conditions in a cell recycle bioreactor were also investigated. Cell concentrations of 70 to 130 g/L were recycled using a microporous membrane with a small specific filtration area. 4 figures, 2 tables.

43521 **Conversion of henequen pulp to microbial biomass by submerged fermentation.** Blancas, A. (Center of Scientific Research of Yucatan, Merida, Mexico); Alpizar, L.; Larios, G.; Saval, S.; Huitron, C. *Biotechnology and Bioengineering Symposium;* No. 12, 171-175(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Mexico has cellulosic by-products that could be developed as renewable food sources for animal consumption. Sugarcane bagasse and henequen pulp are the most important of these materials because they are abundant, cheap, renewable, and nontoxic, in addition to being underutilized. A significant research and development effort has centered on the production of single-cell protein from sugarcane begasse. Nevertheless, there are no large-scale processes that utilize this substrate as a source of carbon, probably because of the extensive physical or chemical pretreatment that is needed. Henequen pulp is a by-product which is obtained in large amounts in southeastern Mexico in the process of removing fibers from the leaves of agave (sisal). A group has been working on a fermentative process that will increase the protein content of the henequen pulp by microbial conversion. The primary aim is to carry out the conversion without chemical pretreatment of the substrate and without a separation step for cells and residual substrate. A gram-negative cellulolytic bacteria has been isolated which grows well on microcrystalline cellulose, pectin, and xylane and it is able to convert an appreciable fraction of henequen pulp to microbial biomass. In this article, some results on the effect of substrate and nitrogen source concentration, on the protein enrichment of the henequen pulp, as well as the content of essential amino acids of fermented henequen pulp are presented. 4 figures.

43522 **Acidogenic bioconversion of C_1 compounds.** Datta, R. (Exxon Research and Engineering Co., Linden, NJ). *Biotechnology and Bioengineering Symposium;* No. 12, 177-182(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Anaerobic bioconversion of methanol and CO by Butyribacterium methylotrophicum is discussed. B. methylotrophicum can ferment methanol heterotrophically, and a metabolic mutant (CO strain) can ferment CO autotrophically, producing acetic and butyric acids as reduced metabolic end products. Batch fermentation data show that product formation occurs due to both growth and maintenance energy requirement, and carbon flow to cells or products can be manipulated by changing ratios of carbon sources in the medium. These organisms are very efficient both for formation of end products and synthesizing cell mass. Major improvements in rates of bioconversion and concentration of products are needed, and development of economical and efficient product recovery processes are required before commercial applications can be developed. 2 figures, 2 tables. (DP)

43523 **Recovery of acetic acid from dilute acetate solution.** Busche, R.M.; Shimshick, E.J.; Yates, R.A. (E.I. du Pont de Nemours & Company, Inc., Wilmington, DE). *Biotechnology and Bioengineering Symposium;* No. 12, 249-262(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Petroleum-based feedstocks have reached such high prices that interest is increasing in possibly producing oxychemical feedstocks, such as acetic acid, from renewable materials like corn or lignocellulosic biomass. The organism Clostridium thermoaceticum converts glucose or xylose to acetic acid in nearly quantitative yields. However, at neutral pH, the product is in acetate form. This study explores using carbon dioxide at 75 atm and 55°C to acidify the fermenter effluent to release free acid for extraction by conventional solvents. The acid is subsequently recovered by azeotropic distillation. The steam required to drive this still is by far the cost-controlling element of the recovery process. Process economics would be greatly improved if the organism could be adapted to higher product concentrations at lower pH. 8 figures, 4 tables.

43524 **Use of plastic construction materials in small-scale fuel alcohol production.** Lightsey, G.R.; Kadir, O. (Mississippi State Univ., Mississippi State). *Biotechnology and Bioengineering Symposium;* No. 12, 297-300(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Several general designs for small-scale fuel alcohol plants that have been published primarily use conventional materials of construction (steel, copper, etc.). A fuel alcohol plant owned by Dixie Fuels, Inc. Valley Park, Mississippi, and a farm-scale alcohol plant being developed by the Tennessee Valley Authority have incorporated plastic materials in several areas of their plants; results have been excellent in terms of reduced materials, labor, and operating costs. However, plastics were not used in the distillation step. This work investigated the suitability of small-scale distillation equipment made entirely or partially from plastics. A low-cost alcohol distillation system can be constructed using chlorinated poly(viny chloride) (CPVC) pipe or poly(vinly chloride) (PVC) plastic pipe for the column and heat-exchanger shells. Although pipe made from CPVC is preferred, schedule 80 PVC pipe can be used if external supports are used to provide rigidity. 3 figures, 1 table. (DP)

43525 **Electrochemical oxygenation of livestock wastes.** Brumm, T.J.; Steinberg, M.P.; Day, D.L. (Univ. of Illinois, Urbana). *Biotechnology and Bioengineering Symposium;* No. 12, 327-335(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

This study examines in situ electrolysis of water for oxygenating aerobic fermentations as an alternative to mechanical aeration. Solids reductions in swine wastes of 60 to 70% were obtained, although evidence of inhibition was found. Current efficiencies, based on Faraday's law, from 70 to 100% were attained. Hydrogen production at efficiencies as high as 162 L/kW h were obtained. Increased temperature favorably affected the system. Optimum performance can be expected at higher temperatures and solids loading rates. It was determined that the process is technically feasible. Economic feasibility remains to be determined. 3 figures, 1 table.

43526 **Chloroplast bioengineering: the greening of chloroplasts in vitro.** Rebeiz, C.A.; Daniell, H.; Mattheis, J.R. (Univ. of Illinois, Urbana). *Biotechnology and Bioengineering Symposium;* No. 12, 413-439(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

During the first symposium on biotechnology in energy production and conservation we discussed the concept of cell-free agriculture and described its initial implementation via the assembly of an experimental photosynthetic reactor. Transducing photosynthetic membranes capable of converting solar energy, CO_2, and H_2O into chemical energy at extremely high efficiencies, approaching the theoretical efficiency of photosynthesis, are very essential components of the reactor. Although such membranes are not presently available, the technology for the bioengineering of such manmade membranes is developing very rapidly. We have been working on this problem for the past several years and as a first step in the right direction, it is now possible to biosynthesize chlorophyll in cell-free systems at rates higher than those observed in intact greening plants. This progress has been made possible by considerable improvements in analytical techniques and instrumentation and in our understanding of the biochemistry of the greening process. 4 figures, 6 tables.

43527 **Electrical and optical properties of amorphous thin films.** Emin, D. (Sandia National Labs., Albuquerque, NM). pp 17-57 of Polycrystalline and amorphous thin films and devices. Kazmerski, L.L. (ed.). New York, NY; Academic Press, Inc. (1980). Contract AC04-76DP00789.

The structures of covalently bonded amorphous semiconductors are reviewed and the differing definitions of electronic localization are described. Models of localization are presented along with discussions of dark transport for differing models. Properties of amorphous semiconductors during and after illumination are considered as well as the nature of the absorption associated with different models. Photon-induced electronic properties are discussed and a summary is given of current knowledge with emphasis on outstanding issues. 89 references. (MJJ)

43528 **(PNL-TR—424) Production of lactic acid by high-speed fermentation method.** Osipov, L.; Oshis, F. Translated from *Uchenye Zapiski, Rizhskii Politekhnicheskii Institut ;* 6: No. 8, 179-187(1962). Contract AC06-76RL01830. 15p. NTIS, PC A02/MF A01. Order Number DE83014783.

This paper describes the production of lactic acid by a high-speed fermentation method using bacterial cultures 52, 70, and Lactobacillus delbrueckii cultures. The purpose of our work was first to find appropriate stimulants (beer yeasts, etc.) in whose presence it would be possible to achieve a high fermentability index with a reduced fermentation time; and second, to check the feasibility of using hydrolysate of cellolignin from spruce as the raw material for obtaining lactic acid by the fermentation method.

1406 Photovoltaic Power Systems

REFER ALSO TO CITATION(S) 43491, 43497, 43536, 43635

43529 **(DOE/ET/20624—T4) Airport solar photovoltaic concentrator, Phase III. Project status report No. ASPCP III-4, 1 February 1983-30 April 1983.** (Arizona Public Service Co., Phoenix (USA)). 1983. Contract AC04-80ET20624. 22p. NTIS, PC A02/MF A01. Order Number DE83014751.

Portions are illegible in microfiche products.

The objective of the work reported is to operate and evaluate at the Phoenix Sky Harbor International Airport for two years the photovoltaic system installed there which consists of an 80-array subsystem with a nominal rating of 225 peak kilowatts direct current output at the array field at standard conditions of 100 mW/cm^2 AM1.5 insolation, 20°C ambient temperature and 3 m/sec wind speed. Difficulties with the array I-V tests are reported. System operation and maintenance are discussed, including operating data and system downtime as well as data acquisition. Visitors center operation and information dissemination are also briefly reported. (LEW)

43530 (EPRI-AP—2884-SR, pp 5.1-5.13) **Photovoltaic system requirements: central and distributed applications.** Taylor, R.W. (Electric Power Research Inst., Palo Alto, CA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The requirements for energy-significance of photovoltiac systems in the US are illuminated. Analysis techniques for estimating allowable system costs are described, followed by a comparison of distributed and central applications. Establishment of cost and performance targets is then discussed. (LEW)

43531 (EPRI-AP—2884-SR, pp 5.29-5.38) **Photovoltaic field test performance assessment.** Inglis, D.J. (Boeing Computer Services Co., Tukwila, WA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Findings from a set of photovoltaic field tests are summarized. Site instrumentation and data collection are described, and array performance is plotted and discussed for one site. Power conditioning subsystems and peak power tracking are discussed. (LEW)

43532 (EPRI-AP—2884-SR, pp 5.39-5.45) **Photovoltaic status assessment: industry perspective.** Murray, W. (Strategies Unlimited, Mountain View, CA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

A US industrial viewpoint is presented on three principal topics: the current status of the worldwide photovoltaic industry, the impact on the industry of the recent withdrawal of support by the US federal government, and what the future responsibilities of

industry and government will be over the next several years to continue the successful development of photovoltaic technology. (LEW)

1407 Solar Thermal Power Systems

REFER ALSO TO CITATION(S) 43651, 43686, 43701

43533 (BMFT-FB-T—82-198) Solar thermal power plant 30/50 kWsub(e). Kraft, M. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 47p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750200.

Based on an agreement between the Government of the Federal Republic of Germany and the Kingdom of Spain the 2 firms AUXINI S.A. and M.A.N.-Advanced Technology signed a contract for the common development of Solar-Farm-Plants. As a first step of this project a test-site has been built up containing a testhouse, street, workshop and sufficient measurement equipment. In 1980 the test site has been increased to 18,000 m^2 and an additional office building has been erected. The installed Solar Thermal Power Plant consists of 3 different collector fields with a total collector area of 582 m^2 a tankfarm storage system, has a capactiy of 1,15 MWh th. at a temperature increment of 100 K, the prime-mover circuit with a screw expander about 50 KWe peakpower output and the control and supervision system. The tests started in 1978 and have been concentrated on components and the system for the production of thermal energy, which mainly will find an application in industrial processes. For this peak efficiencies between 50 and 60% and yearly efficiencies of 30-40% have been evaluated.

43534 (CEA-CONF—6591) 100 kW Solar Thermal Electric Experimental Plant. Bacconnet, E.; Bliaux, J. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Dec 1982. 16p. (CONF-821244—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750928.

From Midterm workshop on Distributed Collector System (D.C.S.); Almeria, Spain (8 Dec 1982).

Paper copy only, copy does not permit microfiche production.

A focussing collector thermal-electric power plant has just been erected in Corsica (France). This plant consists of a field of 1176 m^2 fixed mirror concentrators, producing heat at 250°C, a stratification thermal energy storage of about 1250 kWh, two power conversion units of 45 kWe each, with a supersonic turbine expanding a heavy organic working fluid, and two cooling towers of 200 kW each. This full-scale prototype has been built mainly in order to demonstrate the interest of the distributed collector solar plant concept, in the power range from 50 kWe to 1000 kWe, and the temperature range from 150 to 300°C. This paper describes the conceptual design and the performances of the plant, and discusses problems which were met during construction

43535 (DOE/SF/90506—1) 1/4-megawatt solar receiver. Final report. (Sanders Associates, Inc., Nashua, NH (USA). Energy Systems Center). Oct 1979. Contract AC03-77SF90506. 266p. NTIS, PC A12/MF A01. Order Number DE83014527.

The design and construction of a 1/4 MWt Air Cycle Solar Receiver has been completed and successfully tested at the Georgia Institute of Technology, Advanced Components Test Facility. The receiver was designed to deliver air at 1100°C (2000°F). The receiver operates at ambient pressure and does not require a window to seal the aperture. By using a novel ceramic matrix for solar energy absorption and heat transfer, the receiver can provide high efficiency solar energy collection with very low pressure drops. A terminal concentrator surrounding the receiver aperture is used to boost aperture concentration to about 2000. An additional feature is a compliant ceramic support system which minimizes the thermal stresses.

43536 (EPRI-AP—2884-SR) EPRI conference proceedings: solar and wind power - 1982 status and outlook. DeMeo, E.A. (Kansas Univ. Center for Research, Inc., Lawrence (USA)). Feb 1983. 242p. (CONF-8208121—). NTIS, PC A11/MF A01. Order Number DE83901829.

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Portions are illegible in microfiche products.

Separate abstracts were prepared for 18 papers in this proceedings. Not separately abstracted are speeches and presentations covering: past progress and future directions in solar and wind power research and development, new directions in Federal solar electric programs, Solar Energy Research Institute status and outlook, ARCO Solar Industries' involvement in the production of potential solar electric technologies, wind power status and outlook, utility requirements, roles and rewards, and a panel discussion on solar and wind power status and outlook as viewed from industrial, utility, financial, and government perspectives. (LEW)

43537 (EPRI-AP—2884-SR, pp 2.1-2.19) Solar One Project. Reeves, J.N.; Skvarna, P.E. (Southern California Edison Co., Rosemead). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

An overview of the Solar One Project is presented. The costs and schedule and highlights of the planned test program, including operation and maintenance, are discussed, as well as experience to date. (LEW)

43538 (EPRI-AP—2884-SR, pp 2.21-2.24) Shenandoah Solar Total Energy Project. King, J.W. (Georgia Power Co., Shenandoah). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The objectives, design, operation, and achievements of the Shenandoah Solar Total Energy Project are reported. The system provides 400 kW of electrical power and 1.3 MW of thermal power in the form of steam for pressing high fashion ladies garments and air conditioning for 125 people working in a 25,000 square foot plant. The system is cascaded. Energy is provided to a steam generator from parabolic dish collectors. The system is designed for interconnected operation on the Georgia Power system and for peak load shaving. It is also capable of stand-alone operation. (LEW)

43539 (EPRI-AP—2884-SR, pp 2.25-2.29) Scoping study: molten salt solar electric experiment. Darnell, J. (Bechtel Group, Inc., San Francisco, CA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The experiment discussed has as its goal to demonstrate a small-scale solar power plant using molten nitrate salt as a primary working fluid. The objectives and tasks of the project are listed and described. Objectives include: demonstration of integrated operation of advanced central receiver system components; refinement of operating procedures and automatic control methodology; reduction of technical risk for future commercial plants; hands-on experience for operators; and identification of any further development needs. A 5 MW/sub t/ molten salt receiver subsystem research experiment was tested. (LEW)

43540 Solar one generates first electricity: commercial design completed. *Modern Power Systems;* 2: No. 9, 71-74(Oct 1982).

The largest solar-powered electrical generating facility, which recently went on stream, is described. Using 1818 heliostats, the solar energy is focused on a boiler. Steam is generated to drive a turbine to produce 10 MWe. The facility, located near Barstow (California), and supported by the Department of Energy and Southern California Edison Company, is discussed. If successful, a second and larger (100 MWe) commercial demonstration plant is planned. The heliostats designed for the larger plant are discussed as well as features of the tower structure and the control systems. (MJJ)

1408 Ocean Thermal Gradient And Salinity Gradient Power Systems

43541 (ANL/EES-TM—224) Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary. (Argonne National Lab., IL (USA)). May 1983. Contract W-31-109-ENG-38. 79p. NTIS, PC A05/MF A01. Order Number DE83015742.

The purposes, methods, and principal findings are summarized for programs in ocean thermal energy conversion, health and environmental effects of coal and wood gasification, environmental control technology (including flue gas cleaning for coal-fired boilers, coal cleaning, and environmental control for fermentation alcohol plants), resource conservation and recovery (including energy from municipal waste, ethanol from cellulosic feedstocks, industrial cogeneration, and resource recovery from industrial watewaters, experimental systems for high-energy physics, and systems analysis and modeling. (LEW)

43542 (ESC—18) Energy from Meuse and Rhine. A systematic analysis. de Graaf, F.A.M. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1982. 100p. (In Dutch). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770221.

Two different technologies to extract useful energy from rivers have been considered. The first technology concerns the conventional and well known application of hydropower plants. The second concerns the technical possibility to extract useful energy from the mixing process of fresh water (river or other flows) with salt water of the North Sea. This can be achieved on the basis of osmosis. Such systems, which have not been developed or demonstrated till now, are called 'osmotic energy conversion'-systems (OEC-systems). Available hydrological data of the rivers Rhine and Meuse have been used to calculate the theoretical energy potential for both technologies. In order to determine the technical potential a preliminary system-analysis of a simplified OEC-system is made. The total technical potential of the two technologies together amounts to about 6.9 TWh electricity per year at a total installed design power equal to 2366 MW. About 85 percent of the calculated potential originates from the possible application of OEC-systems. Since physical similarity exists between the OEC-system and desalination plants based on reverse osmosis, information has been gathered concerning the cost of membranes used in such systems. No estimate was made of commercial energy production of OEC-systems. From estimated 1981 costs of electricity delivered by the Dutch power plants - which are mainly fossil fired - it was concluded that for the river Meuse the economic potential for conventional hydropower amounts to about 0.4 TWh at an installed design power of 73 MW.

43543 (SAN—1568-78/4(Vol.2)) Ocean thermal-energy-conversion power-system development. Phase I. Preliminary design report. Volume II. Appendixes A, B, and C. (Lockheed Missiles and Space Co., Sunnyvale, CA (USA). Ocean Systems Div.). 18 Dec 1978. Contract AC03-77ET20299. 200p. (LMSC-D—630248(Vol.2)). NTIS MF A01. Order Number DE83013287.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

A technical description is presented of the closed cycle ammonia power system modules derived for a reference surface platform in an immersed configuration (with two variations) as well as an alternative power system incorporated into a submerged detachable module. The report consists of the following: Appendix A. System analysis and performance (computer runs, sensitivity analysis, individual studies etc.); Appendix B. System and component specifications for TA and 10 MW drawings; and Appendix C. General arrangements envelope, flow, piping, subsystem, etc. (structure analysis, stability analysis).

1409 Solar Thermal Utilization

REFER ALSO TO CITATION(S) 43478, 43482, 43487, 43536, 43538, 44050, 44065, 44066, 44082, 44107

43544 (BEOP—6) Status report on the Dutch National Research Program on Solar Energy per 31 December 1980. Joon, K. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jul 1981. 72p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Progress made during 1980 in the Dutch National Research Program on Solar Energy is reported. A status report is given on the research programs concerning solar boilers, solar space heating and annual energy storage.

43545 (BEOP—13) Status report on the Dutch National Research Program on Solar Energy per 31 December 1981. Joon, K. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1982. 56p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Progress made during 1981 in the Dutch National Research Program on Solar Energy is reported. A status report is given on the research programs concerning solar boilers, solar space heating and annual energy storage.

43546 (BMFT-FB-T—83-078) Development, testing and application of simple solar air heaters for agriculture and industry. Meuren, K.; Reuss, M.; Vogt, S.; Schulz, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). May 1983. 124p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83751044.

Portions are illegible in microfiche products.

The objective of this investigation project was the determination of the thermal efficiency and the collection of other technical and economical data of solar air heaters for drying agricultural products. A plant was built up for parallel testing of 10 collectors. The efficiency-line, evaluated from data of bright and sunny days, shows the efficiency drawn against the reduced parameter and is valid under steady-state or quasi-steady-state conditions. For a long measuring period of 3 months in the summer of 1981 the total amount of heat collected by the different solar air heaters and the drying capacity of the warm air was evaluated. Measurements have been done on the pressure-drop over the collectors and the degradation of the optical properties of the used plastic covers. Furthermore some estimations about economics of solar air collectors for drying have been made.

43547 (BNL—51627) Brookhaven solar-heat-pump simulator: technical description and experimental results. Catan, M. (Brookhaven National Lab., Upton, NY (USA)). Jul 1982. Contract AC02-76CH00016. 61p. NTIS, PC A04/MF A01. Order Number DE83015182.

The series solar-assisted heat pump (SAHP) system has the potential to deliver heat with very high seasonal coefficients of performance (coefficient of performance or COP is the ratio of useful heat delivered to electrical power consumed). This potential rests on the ability of the heat-pump component to use the high source temperatures available from the solar-collector component to deliver heat with a COP which rises monotonically with source temperature. The Brookhaven National Laboratory (BNL) Heat Pump Simulator has played an important role in a program aimed at demonstrating the feasibility of building simple potentially inexpensive heat pumps for use in SAHP systems. Basically the work described here consists of the following: (1) The construction and testing of a laboratory heat pump built from conventional components and characterized by a very desirable COP versus source temperature profile. (2) The testing of two prototype SAHPs built by heat-pump manufacturers under contract to DOE. (3) Detailed component and control tests aimed at establishing improvements in the SAHP prototypes. The paper describes, in some detail, the BNL Heat Pump

Simulator, a versatile instrument used to test heat pumps and heat-pump subcomponents under transient and steady-state conditions.

43548 (CONF-800972—) **US Department of Energy Passive and Hybrid Solar Energy Program update meeting.** (Planning and Management Associates of Greater Washington, Inc., DC (USA)). 1980. Contract AC03-80CS30211. 367p. NTIS, PC A16/MF A01. Order Number DE82021979.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Separate abstracts were prepared for 108 papers in this conference proceedings. (LEW)

43549 (CONF-800972—, pp 1.7-1.11) **Overview of the Passive and Hybrid Solar Energy Program.** Maybaum, M.W. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The DOE Passive and Hybrid Solar Energy Program is designed to accelerate market penetration through commercialization activities aimed at overcoming key barriers to widespread use of passive technologies. The five areas concerned are residential buildings, commercial buildings, passive/hybrid solar energy products, solar cities and towns, and agriculture. After a brief description of the program's background, the program is summarized, and technical accomplishments and future activities are discussed. (LEW)

43550 (CONF-800972—, pp 2.1-2.3) **Overview of residential buildings program.** Pellish, D.M. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The mission of the Residential Building Program is to plan, implement and evaluate programs that develop and promote passive and hybrid solar systems for residential buildings. The mission of the Passive Products Program is to develop, field test, and commercialize materials, components, and assemblies for passive and hybrid systems and subsystems. A program to establish new institutional networks in both public and private sectors to promote passive solar energy is described. Program thrusts include residential activities, educational programs for designers, builders, code officials, and consumers, design tools and construction drawings, assistance to industry in development of passive building designs, products, materials, and systems, monitoring of buildings, and basic and applied research to improve system performance and lower cost. Program goals, accomplishments, and plans are summarized. (LEW)

43551 (CONF-800972—, pp 2.4-2.6) **Massachusetts Multi-Family Passive Solar Housing Program.** Rouse, R.E. (Massachusetts Executive Office of Energy Resources, Boston). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A unique combination of federal, state, and local resources and initiative is producing energy-efficient/passive solar elderly housing in Massachusetts. The program includes both new projects and retrofits, with building types ranging from mid-rise, high density urban structures to two-story suburban townhouses. Seventeen projects, including over 400 passive solar units, are in working drawings or out to bid and more are in concept development. It is anticipated that present funding will ultimately permit construction of as many as 800 passive solar heated apartments. On the average, these projects will use only 25% of the energy required to heat a similar building of conventional design.

43552 (CONF-800972—, pp 2.7-2.8) **Potential for solar applications in DOE's Building Energy Performance Standards Program.** Cable, J.H. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Among the most significant long-term building conservation activities within the Department of Energy has been the Building Energy Performance Standards Program. This effort, which is expected to have far-reaching consequences for buildings and for those who design them, is illustrative of the ways in which the solar and conservation buildings programs within DOE complement one another. Some of the means are cited by which the performance standards should enhance opportunities for the use of solar energy in buildings. Other areas in which the solar and conservation sides of DOE merge are also discussed.

43553 (CONF-800972—, pp 2.9-2.11) **Passive solar standards, performance criteria and code provisions.** Dikkers, R.D. (National Bureau of Standards, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The development of performance standards and criteria for solar energy systems, subsystems and components is one of the key objectives identified in the Department of Energy National Program for Solar Heating and Cooling of Buildings. Various standards needs, planning efforts and some of the current activities which are underway relating to passive solar standards, performance criteria and code provisions are described briefly.

43554 (CONF-800972—, pp 2.12-2.15) **Passive solar commercialization in the Northeast.** Thomas, D.O. (Northeast Solar Energy Center, Boston, MA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Efforts are reported in the areas of passive system design, instrumented monitoring, and energy audits. Also discussed are efforts in development and support of the passive solar industry, marketing, consumer education, public information, and assisting states in developing incentives. The Solar Cities Program is discussed, which evaluates the potential for solar applications in urban areas. (LEW)

43555 (CONF-800972—, pp 2.16-2.19) **Southern Solar Energy Center Passive Buildings Program.** Turkia, K.M. (Southern Solar Energy Center, Atlanta, GA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Southern Solar Energy Center is providing technical guidance and small economic incentives to accelerate the adoption of passive construction techniques in the Southeast through a variety of programs. These include focused design/build activities for single and multi-family structures, expanding retrofit guidance and rigorous design tool development to meet the specific needs of the South. Supportive outreach activities assure the timely dissemination of generated information.

43556 (CONF-800972—, pp 2.20-2.21) **Passive solar: the 80's and the West.** Davis, W.B. (Western Sun, Portland, OR). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The passive programs described include technology and outreach services. The key technology programs include: monitoring of passive solar homes, development of stock passive solar house plans, providing design engineering services for selected audiences, developing design tools for builders, architects, and engineers, and alternatives to mechanical cooling systems in commercial buildings. Outreach Services include solar training, information, and education programs designed to reach specific audiences such as builders, developers, lenders, and local government officials. (LEW)

43557 (CONF-800972—, pp 2.22-2.24) **Overview of Passive Solar Manufactured Buildings and Metro Denver Home Builders programs.** Baccei, B. (Solar Energy Research Inst., Golden, CO). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The progress of the Manufactured Buildings Program initiated by the Solar Energy Research Institute (SERI) and the Department of Energy (DOE) is presented. The model which this program provides for government working with industry is also discussed.

43558 (CONF-800972—, pp 2.24-2.25) **Denver Metro Home Builders Program.** 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Department of Energy's Solar Energy Research Institute (SERI) and Western Solar Utilization Network (Western SUN) and the State of Colorado's Office of Energy Conservation (OEC) have worked closely with the Home Builders Association of Metro Denver to plan and initiate a pilot assistance program for home builders. The program is assisting home builders in design, construction, thermal performance monitoring and market promotion of energy conserving passive solar homes. Due to innovative contracting procedures, the program has been able to move ahead with unprecedented speed. Builders and designers have responded to the program with great enthusiasm. Those selected to participate in the program include a range of sizes of builders. Most noteworthy, in terms of influencing other builders to follow, are the large nation wide builder organizations which are represented in the program. The innovative contracting procedures, the approach of early coordination and planning with industry associations, the passive solar designs developed and status of homes constructed under the program are reported.

43559 (CONF-800972—, pp 2.26-2.28) **Development of the independence series bringing passive solar to the real world.** Milliken, A.N. (Acorn Structures, Inc., Concord, MA). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30363.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A family of related houses, named the Independence Series, is described. Each has three bedrooms and two baths, is of the traditional salt box shape, and have low heat loss. Sizes range from 1368 to 1896 square feet. Two models have relatively typical window arrangements, while the other two show off their passive solar characteristics. The expected performance of the passive solar systems is discussed, and the status of the program is summarized. (LEW)

43560 (CONF-800972—, pp 2.29-2.30) **Passive solar mobile home project.** Nall, D.H. (Berkeley Solar Group, CA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A passive solar heating and cooling system has been developed for a multi-wide mobile home. The system is a roof aperture, distributed mass system using latent heat storage in Glauber's salt. The roof aperture is a vertical clerestory system. Reflective interior blinds close the aperture during warm weather, and the attic space may be cooled by ventilation with night air, which may be cooled further by an evaporative cooler. Specific goals met by the design are discussed, including a solar fraction of at least 50%. (LEW)

43561 (CONF-800972—, pp 2.31-2.32) **System development: solar home heating.** Scofield, M.P. 1980. NTIS, PC A16/MF A01. Contract AC07-76ID01570.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Two hybrid and one passive house are described. The hybrid houses are factory built and use an air-type heating system with integral wall collectors and rock thermal storage. Features included for test include the air-to-water heat exchanger with thermosiphon flow to the preheat tank and the nocturnal cooling system. The two houses were continuously monitored for a year, and two separate collectors were built for stagnation tests to determine the long-term performance of collector materials. The passive house is a panelized, factory-built two-story house using direct gain and integrated thermal mass, including some in the upper floor, and night insulation over windows. (LEW)

43562 (CONF-800972—, pp 2.33-2.34) **Development of a passive solar design for a manufactured building.** Stanaland, R. (Madison Industries Inc. of Georgia, Conyers). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30375.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A variety of passive solar energy utilization concepts have been considered for an initial application of a panelized or modular manufactured classroom building. Four concepts - direct gain, water wall, sunspace, and integral collector wall - were selected for further development and evaluation. Design layouts for the four techniques have been prepared. Annual simulations using typical solar and weather data were computed to evaluate the thermal performance of the candidate designs. Comparative costs were estimated and combined with the results of the annual simulations to assess the value of the passive alternatives.

43563 (CONF-800972—, pp 2.35-2.36) **Design and construction of three manufactured passive solar homes: a field test.** Crowley, J.S.; Johnson, R.J. (NAHB Research Foundation, Inc., Rockville, MD). 1980. NTIS, PC A16/MF A01. Contract FG02-79CS30300.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Design, construction, and field testing of a series of production type passive solar homes are reported. Consumer and builder marketability, cost effectiveness and thermal performance are the guiding criteria for determining potentially viable applications with projected mainstream adoption. Four homes are being constructed with an expected completion date of November 1, 1980. All prototypes are based on a best selling model bi-level home with split foyer. The four homes are juxtaposed in a side-by-side situation to facilitate accurate comparative instrumentation on the passive solar systems being explored.

43564 (CONF-800972—, pp 2.37-2.39) **Passive and hybrid solar manufactured housing and buildings.** Wilson, S.J.; Michels, T. 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Three model manufactured homes were designed for passive solar gains for space heating. Their thermal performance was evaluated using steady-state degree day heat loss calculations with modified monthly solar gain. One of the models was then selected for further analysis through a dynamic hourly computer simulation. The passive system is a mixture of direct gain and sunspace features. (LEW)

43565 (CONF-800972—, pp 2.40-2.41) **Passive and hybrid solar manufactured housing and buildings. Phase I.** Carusone, J. (Northern Homes of Pennsylvania, Inc., Chambersburg). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30378.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Potential objections to passive solar heating include extra cost, aesthetics, and lifestyle demands. The goal of the work reported is to overcome objections and increase the number of manufactured houses using passive solar systems. Elements of the effort include: a broad variety of styles, a low cost, easy to install glazing, a common inventory of solar parts that can be adapted to a wide range of styles and conditions, and attractive, functioning venting

for heat storage and movement. In addition, a super insulation effort is reported. Marketing of both types of homes is described. (LEW)

43566 (CONF-800972—, pp 2.42-2.45) **Passive and hybrid solar heating for manufactured housing.** Usry, J.D. (Usry Inc., Richmond, VA). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30385.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Direct gain and solarium concepts are identified as the most promising candidates for passive solar heating of manufactured housing, based on construction techniques, design concepts, site construction, and factory processes, along with cost. The two concepts are described, including some of their advantages. (LEW)

43567 (CONF-800972—, pp 2.46-2.49) **Impact of controls in passive solar heating of buildings.** Sebald, A.V.; Clinton, J.R. (Univ. of California, San Diego, La Jolla). 1980. NTIS, PC A16/MF A01. Contract AC02-80CS30260.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objectives of the work reported are: to understand the quantitative heat transfer relationships extant passive solar residences; to determine the proper way to economically control passive residences such that high solar fractions and high comfort levels can be maintained; and to guide architects, builders, and owners in the proper use of controls and provide guidance regarding control components which need to be produced. A comfort index for use in passive solar and conventional buildings has been developed, and a thermal network model of a passive solar rockbin has been generated. A simulation analysis of a single zone building integrating Trombe wall, direct gain, and rock bin has been completed. Simple and effective control strategies for avoiding peak auxiliary energy consumption in passive buildings have been identified. A method has been developed for computing radiant energy exchange in rooms. A simplified design tool for passive buildings and a unified theoretical construct for passive solar buildings are reported. (LEW)

43568 (CONF-800972—, pp 2.50-2.51) **Analytical and experimental investigation of the Trombe wall.** Casperson, R.L. (Energy Engineering Group, Inc., Golden, CO). 1980. NTIS, PC A16/MF A01. Contract FG02-79CS30244.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

An experimental determination of the velocity and temperature profiles in the air gap of a vented Trombe wall will be made using hot-film anemometry equipment. The thermocirculation data will be obtained during periods of solar illumination for multiple wall configurations of air gap width and inlet/outlet flow areas. Heat transfer correlations for the gap thermocirculation process will be developed using the experimental data and incorporated into an existing passive solar computer program.

43569 (CONF-800972—, pp 2.52-2.53) **Investigation of passive cooling techniques for hot-humid climates.** Akridge, J.M. (Georgia Inst. of Tech., Atlanta). 1980. NTIS, PC A16/MF A01. Contract AC02-79CS30238.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The initial objective of the reported program was to review existing passive cooling techniques, passive cooling concepts, and potential thermal sinks which might provide passive cooling for hot-humid climates. A concept has been identified and is in the process of being developed which shows significant potential for passive cooling in hot-humid climates. Computer simulation routines have been developed which make possible relatively quick parametric studies which will assist in optimizing the concept. Computer simulation routines have been implemented which will provide charging schedules and realistic system performance predictions. Soil temperature probes have been installed in shaded and unshaded vertical test shafts to measure soil temperatures to a depth of 12 meters. An air-to-earth cooling tube installation has been instrumental and is being studied. A computer simulation routine for the air-to-earth cooling tubes has been developed and is being compared with measured performance. (LEW)

43570 (CONF-800972—, pp 2.54-2.56) **LASL passive program.** Neeper, D.A. (Los Alamos Scientific Lab., NM). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Solar Load Ratio correlations have been developed for attached greenhouses in 2 geometries, along with some sensitivity studies. Thermal performance of components and buildings was measured, and a convective loop test is planned. Design rules are being developed for thermal convection through doorways and other openings between rooms and buildings. Test rooms employing thermal storage walls of commercial tubes containing calcium chloride and close-fitting rectangular boxes containing the same salt mixed with diatomaceous earth were subjected to experiment. An auxiliary off-peak electrical heating system has been designed and instrumented for a passive solar house. Two volumes of a passive solar design handbook have been released, and a third is planned. Another task is program support to DOE. A task to examine the cooling implications of the direct gain, storage walls, and sunspace heating systems is planned. (LEW)

43571 (CONF-800972—, pp 2.61-2.64) **Applications of DOE-2 for the analysis of passive solar buildings.** Hunn, B.D. (Los Alamos Scientific Lab., NM). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The range of applicability of the initial version of the DOE-2 code for building energy analysis has been determined for direct gain systems, as well as the sensitivity of the program's performance to key physical effects. Based on these results, a custom weighting factor loads calculation method has been developed, tested, and implemented in the program. A modified thermal balance scheme was also developed and tested. A preliminary thermal storage wall model has been developed for DOE-2 and verified against test data. Schematic designs were reviewed for passive solar commercial buildings, including a complete DOE-2 analysis of one. (LEW)

43572 (CONF-800972—, pp 2.65-2.66) **Optimum collector area to storage ratio for water wall space heating.** Bahm, R.J. (Univ. of New Mexico, Albuquerque). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A methodology was developed for preparing a design tool for optimizing storage amounts in passive solar heating systems, and a preliminary design tool was developed for optimizing storage amounts in water wall systems. A number of conceptual and analytical tools have been developed to aid designers in understanding solar system performance and design. (LEW)

43573 (CONF-800972—, pp 2.67-2.68) **Passive solar heating of buildings with attached greenhouse.** Jones, R.W. (Univ. of South Dakota, Vermillion): 1980. NTIS, PC A16/MF A01. Contract AC02-79CS30242.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A computer simulation model was developed of an attached greenhouse compatible with traditional wood-frame design and construction practices. It was found that the attached greenhouse generally out-performs storage wall and direct gain types of passive systems. No severe constraints on performance are found to be imposed by traditional construction. Design guidelines have been developed for optimizing the heating performance of attached greenhouses. (LEW)

43574 (CONF-800972—, pp 2.69-2.72) **Continued development and physical validation of computer program DEROB.** Arumi-Noe, F. (Univ. of Texas, Austin). 1980. NTIS, PC A16/MF A01. Contract AC02-80CS30254.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The computer program DEROB (Dynamic Energy Response of Buildings) has been validated against empirical data obtained from 10 structures. These include houses as well as passive solar test rooms. The thermal solution in DEROB was cast into an R-C representation. Later the resultant matrix was abandoned for an iterative solution. During parametric studies it was noticed that light-weight structures yielded consistently high relaxation rates. Upon increasing the number of iterations, the problem disappeared. Project activities include: addressing the non-linear convergence problem, the writing of a new geometric factor algorithm, specular reflection algorithm, and lighting control algorithm. (LEW)

43575 (CONF-800972—, pp 2.73-2.75) **Simulation and design of solar energy systems.** Duffie, J.A.; Beckman, W.A.; Klein, S.A.; Mitchell, J.W. (Univ. of Wisconsin, Madison). 1980. NTIS, PC A16/MF A01. Contract AC02-76CS32588.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Design methods have been developed for direct gain and collector storage wall systems. The maximum and minimum thermal performance of both direct gain and collector storage wall passive systems have been derived analytically. These limits correspond to the conditions of infinite and zero storage capacitance, respectively. Empirical correlations have then been found for the performance of systems with finite internal storage capacitance based on these theoretical limits. The utilizability function, defined as the useful solar energy above a specified level, is the basis for these design methods.

43576 (CONF-800972—, pp 2.76-2.78) **Libertytown solar demonstration home.** Briddell, K. (Colorado Homes, Mt. Airy, MD). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The passive solar heating concept involves collection, storage, and distribution of solar energy in the form of sensible heat. Collection in the Libertytown Home is through south facing windows, two Trombe walls, and an attached greenhouse. Heat is stored in masonry masses contained within the house and distributed by a natural convective loop connecting the two floors. The Libertytown Home was substantially complete in February of 1980 and functioned extremely well for the remainder of the heating season. Actual back-up energy usage for space heating during February and March was 1.66 Btu/sq ft/degree days. The Libertytown Home was open to the public for two weekends during which time 2200 people toured the Demonstration Home.

43577 (CONF-800972—, pp 2.79-2.80) **Passive solar home, Houston.** Reed, R.T. (Doyle Stuckey Homes, Houston, TX). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of the work reported is to design and construct a single-family dwelling of average size and cost in the Houston marketplace and to incorporate in it all of the most cost effective passive solar concepts using state of the art technology and commonly available materials. Because of the intense heat and high humidity of the area, the house is designed to provide a sufficient barrier to air infiltration and heat gain and to maintain good air circulation. There is plenty of shading. Thermal mass is used to store cold or heat, depending on the season. Use is made of the thermal break concept, the intent of which is to break the conduction of heat cycle. (LEW)

43578 (CONF-800972—, pp 2.81-2.84) **Design and performance of a cycle five house: a review.** Schiller, R.J. (Trustway Homes, Inc., Milwaukee, WI). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The purpose of the work reported is to design and construct a direct gain passive solar home which would be energy-conserving, would utilize standard construction methods, and would complement housing of a conventional type in a standard city subdivision. An extremely open plan facilitates air movement from one level to the next. Heavy use areas are located along the southern axis. A three-zone natural gas hydronic heating system is included. Conservation methods reduced the heating load to 2.4 Btu/dd/ft^2. Heat storage is in the thermal mass of storage floors primarily, and also in a fan-forced rock bed. Results of a solar Load Ratio performance prediction are given. (LEW)

43579 (CONF-800972—, pp 2.85-2.88) **Overview of DOE national performance evaluation program.** Hamilton, L.B. (Memphremagog Group, Newport, VT). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A performance evaluation program has been established by DOE for passive and hybrid systems to meet the data needs of the solar community involved in both system and market development activities. Three different classes of performance data acquisition and development evaluation have been defined to supply the diverse requirements of passive solar analysis. These are, in decreasing order of sophistication, Class A, B, and C. The system development portion of this program, described in this paper, focuses on the technical data requirements of the entire spectrum of users. These requirements are prioritized and matched to the most appropriate data sources. Class A performance evaluation provides detailed dynamic system data sufficient for thermal model validation and system optimization studies. Class B provides long-term steady state information on how well a system works (but not necessarily why). Class C provides information on over-all energy use, a description of the passive system and a user assessment. The first year plan includes 9 Class A, 80 Class B, and 400 Class C sites. An overview of the program is presented, including background, implementation, and a contrasting description of the different levels of performance evaluation.

43580 (CONF-800972—, pp 2.87-2.92) **Pfister residence - results of a passive retrofit in a cold climate.** Pfister, P.J. (Architectural Alliance, Minneapolis, MN). 1980. NTIS, PC A16/MF A01. Contract FG04-77CS34146.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A two story wood frame residence was insulated and weatherized and retrofitted with a passive solar system. The operation of the passive system was monitored during the 1979-1980 heating season. The retrofit consisted of the addition of two primary solar gain areas and two secondary solar gain areas and a two-story solarium. Phase change storage is included. Movable insulation covers about 90% of the glazed areas of the house. (LEW)

43581 (CONF-800972—, pp 2.93-2.96) **Monitoring and design study of the White Mountain School hybrid solar building.** Converse, V.O. (Dartmouth Coll., Hanover, NH). 1980. NTIS, PC A16/MF A01. Contract FG02-77CS34139.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The building studied is a two story dormitory sited on a south facing slope. The north side of the building is sheltered by an embankment such that only a one story height with a few windows along its length is exposed. The south facade of the building is entirely glazed, and behind it are four sunrooms, each with 14 m^2 of vertical glazing and 30 m^2 of glazing at a 60° angle. Rockbed storage is used as well as a wood burning kachelofen and oil burning

furnaces for back-up. The long-term energy flows in the solarium/building system were measured, and corresponding efficiencies were calculated. The temperatures in the building were found to fall within acceptable levels on the whole. The mechanical controls were found to be more than needed. Several generic network models were developed in an effort to discover how sophisticated the model would have to be in order to simulate the behavior of the building. (LEW)

43582 (CONF-800972—, pp 2.97-2.100) **Suncatcher monitoring project.** Maeda, B.T.; Treleven, K. (Davis Alternative Tech. Associates, CA). 1980. NTIS, PC A16/MF A01. Contract FG02-79CS30169.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Suncatcher is a passive solar house design whose predominant feature is a cavity formed by a reflective soffit and a lower north-sloping roof which provides enhanced solar heat gain through clerestory windows. An intensive microcomputer-based energy monitoring project on the Suncatcher in a Davis, California residence is reported. More than 75 sensors provide data about temperatures, energy use, and radiation. (LEW)

43583 (CONF-800972—, pp 2.101) **Analysis of performance of passive solar heated nature center.** Moore, F. (Miami Univ., Oxford, OH). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of this project is to instrument, monitor, and analyze the thermal performance of the Patola Nature Center, a direct-gain passive solar heated building near Jasper, Indiana. The Nature Center is a 3200 ft^2 public building presently under construction and scheduled for completion in August 1980. The building's design includes an A-frame type roof with the south 1530 ft^2 60° roof slope double glazed with movable Beadwall insulation. This slope is fabricated using standard greenhouse components to form the Beadwall envelope. A commercially available acoustical tile, (with mirror-finish 4luminized polyester film), is used on the North ceiling slope to reflect insolation to the thermal floor mass, minimizing diffuse ceiling reflection back through the south glass. Interior partitions formed by rows of fiberglass provide additional insolated thermal storage.

43584 (CONF-800972—, pp 2.102-2.105) **Performance analysis of a solar attached greenhouse near Three-Mile Island using fuel bill data.** Hopkins, M. (Inst. for Economic Development, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The data and analysis for a retrofit greenhouse on a one story house in Pennsylvania are reported. Included are electricity consumption and degree day data, from which are derived space heating load reductions. Separate linear regressions were run for pre- and post-retrofit consumption and corresponding degree day data. (LEW)

43585 (CONF-800972—, pp 2.110-2.112) **Critical analysis of the home builder's introduction to passive solar in New York State.** Brownell, B.R. (Adirondack Alternate Energy, Edinburg, NY). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Programs to introduce passive solar heating to the Northeast are criticized on the basis of their misplaced emphasis on windows. It is recommended that stress be placed on insulation, south glass, and thermal storage. Too much glass is said to cause problems for contractors trying to work with it. (LEW)

43586 (CONF-800972—, pp 2.113-2.116) **Iowa-project passive: a passive solar house design being built by selected Iowa Community College building trade programs.** Mercer, R.; Svanoe, P.H. (Iowa Energy Policy Council, Des Moines). 1980. NTIS, PC A16/MF A01. Contract AC02-79CS30156.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A program of the Iowa Energy Policy Council (state energy office) to introduce passive solar technology into community college building trades curricula is described. The center of this program is a passive solar house design that will be built in lieu of the more typical house the colleges usually build. A description of the energy-related features and a prediction of performance of the passive solar house is presented.

43587 (CONF-800972—, pp 2.128-2.130) **Qualitative approach to performance evaluation of passive solar residences.** Sachs, B. (Memphremagog Group, Newport, VT); Towle, S. 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Passive and hybrid systems performance evaluation is being undertaken nationally to support both system development and market development data and information needs through a coordinated program of both quantitative and qualitative research. The more qualitative effort is reported: the collection of non-instrumented data from passive solar residence. This qualitative performance evaluation will provide data on the overall energy use of passive/hybrid buildings. It will also provide non-instrumented data relevant to thermal performance, reliability, durability, safety, cost, and user acceptance.

43588 (CONF-800972—, pp 2.133-2.134) **Development and implementation of passive solar information/promotion plan.** 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A promotion/public information campaign to promote awareness of passive solar concepts and use of passive solar energy techniques among key audiences in the industrial and commercial sectors is reported. Tasks include the development and distribution of various printed matter and promotional tools, use of trade magazines, participating in high impact meetings and activities, and initiating passive solar retrofit projects. (LEW)

43589 (CONF-800972—, pp 3.1-3.3) **Toward passive and hybrid solar commercial buildings.** Shibley, R.G. (Dept. of Energy, Washington, DC). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Passive and Hybid Solar Commercial Buildings Program performs three primary functions: it supports research and development; it promotes the utilization of proven passive concepts and technology; and it sponsors educational and training programs. All of these functions are directed toward the four major uses of energy in commercial buildings: heating, cooling, lighting and domestic hot water. Finally, all of the work in the program is focused on two methods of intervention into the business of building commercial structures: (1) the architectural and engineering design of commercial buildings; and (2) the manufacture of building components (products) and subsystems. This paper describes the program functions, directions and methods of intervention using examples of past and current projects, as well as identifying projects currently under development.

43590 (CONF-800972—, pp 3.4-3.5) **Design of passive commercial buildings: background and major lessons learned.** Kurkowski, T.L. (Dept. of Energy, Chicago, IL). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Recurring issues and lessons in the design of passive commercial buildings are summarized. The fundamental connection between energy and architecture and the need for a good understanding by the passive solar designer of the static and dynamic energy needs of a building are pointed out. The need for careful modelling of buildings for analysis of daylighting analysis is discussed. It is advised that daylighting systems can also serve as passive solar systems simultaneously. Some general economic observations are also made. (LEW)

43591 (CONF-800972—, pp 3.6-3.7) **Passive solar Alaskan school.** Leonard, L.E. (Dept. of Transportation and Public Facilities, Fairbanks, AK). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30321.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Focus of the reported project is on the development of a passive solar building design concept which fits the criteria of rural schools commonly designed and constructed in remote regions of Alaska, and the compilation of a solar design manual appropriate to Alaskan design conditions to be used as a primary reference source by State supported architects and engineers. Significant accomplishments include: modification of the TRNSYS computer model to make its use applicable to high latitude regions; acquisition of hourly solar radiation data; compilation of the first cold region passive solar design manual; and completion of the building design for a model passive solar Alaskan school. (LEW)

43592 (CONF-800972—, pp 3.8-3.9) **Essex-Dorsey Senior Center.** 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30323.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Design work is reported on a project to convert two historic school buildings to a senior center. A narrow L-shaped structure links the two buildings, but they are separated by a courtyard, a plan which facilitates ventilation and daylighting. Veranda areas are used which can function as both indoor and outdoor areas. Activities are scheduled to adapt to changes in temperature and light. Natural ventilation is achieved by design orientation to the prevailing winds. (LEW)

43593 (CONF-800972—, pp 3.10-3.13) **Selected strategies and results from Commercial Buildings Design and Demonstration Program (PON).** Gordon, H.T. (Burt Hill Kosar Rittelmann Associates, Washington, DC); Whiddon, W.I. 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Two of the objectives of the reported program are to support the design and implementation of exemplary and prototypical passive solar commercial buildings and to identify the cost and performance characteristics of passive systems in commercial buildings. There are 33 projects, ranging in size from about 600 ft^2 to about 64,000 ft^2 and representing a number of building types. The locations of the projects are mapped and the building characteristics, principal solar strategies, ratio of collector area to building floor area, and estimated end-use solar contributions to building energy requirements are summarized. The percent of the total building load met by the solar features to the percentage of cost represented by the solar features are compared. The approximate price of conventional energy sources at which the solar strategies employed in each building become competitive is presented. (LEW)

43594 (CONF-800972—, pp 3.14-3.16) **Passive/hybrid heating, cooling, and daylighting concepts for commercial/industrial pre-engineered buildings.** Snyder, M.K. (Butler Manufacturing Co., Brandview, MO); Fraker, H. 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30367;FC02-80CS30366.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The goal of the work reported is to develop and market passive components for pre-engineered metal buildings which will provide natural heating, cooling, and daylighting. Components include: a roof aperture system for passive and hybrid solar heating and daylighting; wall collector panels for passive and hybrid heating; and four different potential storage configurations - a directly-irradiated slab, an under slab horizontal rockbed, contained water storage in the ceiling plenum, and contained phase change material in the plenum space or at the ceiling. For cooling, two concepts have been developed: passive indirect evaporative cooling and night sky radiation roof system which is either directly irradiated to the slab or to phase change storage in the ceiling, both having movable insulation; and a hybrid system which utilizes indirect evaporative cooling and night sky radiation from the metal roof with air circulated in a shallow plenum under the roof through a horizontal rockbed storage. (LEW)

43595 (CONF-800972—, pp 3.17-3.18) **Passive solar retrofit of all-glass office buildings.** Hartkopf, V. (Carnegie-Mellon Univ., Pittsburgh, PA). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30326.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A seven step energy conservation and passive solar audit procedure have been developed for all glass office buildings. Ninety energy conservation and passive solar retrofit strategies for all glass buildings have been completed. The decision-making procedure weighs comfort, Btu savings, and aesthetics against building compatibility, cost, and payback. (LEW)

43596 (CONF-800972—, pp 3.19-3.22) **Advanced techniques in passive solar analysis.** Cumali, Z.O. (CCB/Cumali Associates, Oakland, CA). 1980. NTIS, PC A16/MF A01. Contract AC01-78CS35221;AC03-80SF10840.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Much of the research effort reported has endeavored both to develop direct improvements to the accuracy of the DOE-1/2 thermal loads calculation and to advance the available methodology concerned with analyzing structures and selecting design alternatives. This paper will describe a method which has been developed (and which has since been implemented in DOE-2.1) for generating space specific weighting factors. As a result of this development, the weighting factor and thermal balance approaches have been demonstrated to be equivalent. One further benefit of this research effort has been the contribution of a frequency response method for simplifying the analysis and selection of passive solar design alternatives. Last, a discussion of current efforts concerning improvement of available coupling methodologies will be presented.

43597 (CONF-800972—, pp 3.23-3.24) **College Center.** Dorbrovolny, P. (Colorado Mountain Coll., Glenwood Springs). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30331.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The community education center described is designed as a stepped, two story building with two internal greenhouse/atrium spaces around which activity spaces could be congregated. South facing Trombe walls and structural mass provide thermal storage mass. The design also provides natural daylighting. Performance and life cycle cost are predicted. (LEW)

43598 (CONF-800972—, pp 3.25-3.26) **Shelly Ridge Program Center building.** Grauman, F. (Girl Scouts of Greater Philadelphia, PA). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30338.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A building design was generated, which integrates solutions to the thermal, programmatic and architectural concerns. The main gathering space is served by a modified Trombe wall, which incorporates a mix of opaque collection/storage surfaces and clear direct gain/daylighting panels. The engrance sequence leads through a semi-circular sun-space lobby which is a distribution point for the building's circulation system, and which introduces the solar elements further into the building's interior. This sun-space is also a symbolic focal point, and is arranged to work as a sundial. The building is triangular in plan, allowing the solar elements to face south while the other sides integrate with surrounding features. This form also maximizes the sun face while minimizing the other exposures. The building's performance has been analyzed by several methods, including the Solar Load Ratio method and the TRNSYS computer program (passive version).

43599 (CONF-800972—, pp 3.27-3.30) **Design of passive/hybrid solar systems for manufactured metal buildings for commercial and industrial applications.** Watkins, N. (Gulf States Manufacturers, Inc., Starkville, MS); Bouchillon, C.W. 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30374.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Three passive/hybrid solar heating system preliminary design concepts were generated based on the direct gain, Trombe Wall, and convective wall concepts. The convective wall design concept was selected as the most appropriate system for manufactured metal buildings for commercial and industrial applications. Detailed design and specifications were prepared for the wall panel convective solar collector system with floor slab storage. A computer program for building thermal and lighting energy analysis was modified to provide for direct gain and south vertical wall solar collection with different levels of storage, and the modified program was verified. A life cycle cost computer program was also developed to assist in the marketing phase of the project. (LEW)

43600 (CONF-800972—, pp 3.31-3.32) **Southwest Woodbridge Elementary School.** McCaughey, O.J.; . (McCaughey and Smith Energy Associates, Inc., Tustin, CA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The passive features of the new South Woodbridge Elementary School include natural lighting, a cool pool, and thermally massive walls and floors. The natural lighting is provided by solar-shaded windows, north-facing clerestories, and south-facing light shelves, in conjunction with interspersed courtyards. Automatic dimming controls sense the level of light in each room and adjust the fluorescent lighting to maintain the required level of illumination. The cool pool utilizes approximately 8400 square feet of shallow pool area serving up to 300 thermosiphoning water columns to be distributed throughout the school for passive cooling. Louvres shade the pool from solar gains while permitting it to radiate to the north sky. (LEW)

43601 (CONF-800972—, pp 3.33-3.36) **Building energy analysis of integrated passive designs.** Kammerud, R.; Place, W. (Lawrence Berkeley Lab., CA). 1980. NTIS, PC A16/MF A01. Contract W-7405-ENG-48.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

To date, the LBL program has concentrated on the development testing and verification of public domain analysis tools necessary for exploring the application of passive concepts to commercial buildings. This includes the development of thermal models for incorporation into BLAST and stand-alone analysis capabilities for convective heat transfer under natural and forced conditions. This latter analysis tool is a critical element in the examination and characterization of energy management within passive and hybrid structures. In addition, a comprehensive tool for studying the thermal behavior of passive solar hot water heating systems has been developed. The analysis technique is appropriate for conventional thermosiphons and for innovative systems designed at LBL which ensure positive protection from freezing. In addition to the technical and design research activities, synthesis projects have been initiated. Applications of BLAST to direct solar gain residential buildings have been performed in order to examine: the effect of thermal mass on the heating and cooling loads of conventional and passive solar buildings; the interaction between thermally massive construction and common auxiliary system control strategies; and the impact on cooling load of direct gain passive heating systems. In addition, applications of BLAST in case study commercial building design projects have been a continuing part of the program; these projects not only produce reliable technical input for the project design teams, but also provide direct feedback to LBL regarding the types of analysis capabilities that are needed by the private sector.

43602 (CONF-800972—, pp 3.37) **Mennonite Nursing Home passive solar demonstration project.** Merrill, T.W. (Mennonite Nursing Home, Albany, OR). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30345.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Mennonite Nursing Home features two nursing wings oriented due south with non-convecting Trombe Wall. Clerestory windows over the corridors provide corridor heating and lighting. Domestic hot water is provided by 60 collector panels. Energy usage is monitored. (LEW)

43603 (CONF-800972—, pp 3.38-3.41) **Mount Airy Public Library, Mount Airy, North Carolina.** Mazria, E. (Edward Mazria and Associates, Albuquerque, NM); Morgan, G. 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30329.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Mount Airy Public Library incorporates daylighting, passive solar heating and cooling, and natural ventilation. Daylighting is accomplished with light shelves and clerestories passive heating is mainly by gains through the windows distributed over a large surface area of masonry. Cooling loads are reduced by a light-colored gravel roof, building envelope shading and south glass shading, and thermal mass. (LEW)

43604 (CONF-800972—, pp 3.42-3.43) **DOE Passive Commercial Demonstration Program update report.** Kieffer, B.D. (North Design, Middleton, WI). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30343.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The project summarized was to develop a specific retrofit passive solar solution for an existing commercial/residential building in a cold northern climate. The work described includes an assessment of a conventional building concept to see where the greatest energy use occurs, then to determine the potential for passive solar heating and daylighting. The design selection process follows. (LEW)

43605 (CONF-800972—, pp 3.44-3.45) **De Graff Nature Center: passive solar heated park and recreational building.** Porter, W.H. (Poligon, Holland, MI). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30388.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The primary objective of the work reported was to make a passive solar, vandal-resistant building work in a northern climate with much cloud cover. The solution adapted is an insulated mass wall, either water or masonry, which is insulated to the outside and uses a highly efficient, simple system of collecting heat by a thermosiphon collector. This concept is briefly described along with four others that were also considered, including the approximate solar fraction of each, advantages, disadvantages, and customer objections. (LEW)

43606 (CONF-800972—, pp 3.46-3.47) **Princeton Professional Park (PPP): design for heating, cooling, and daylighting.** Fraker, H. (Princeton Professional Park Partnership, NJ). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30348.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The goals of the work reported are to design and build a prototype energy conserving office complex which meets the cost constraints of the speculative developer market and to explore the architectural potential and significance of such a challenge. An atrium design was developed which contributes to heating, cooling, and lighting, and its performance was simulated by computer. Cooling is also assisted by roof spray during day and evaporation and radiation to the sky at night. Stepped lighting controls adjust to daylighting levels automatically or by hand. (LEW)

43607 (CONF-800972—, pp 3.48) **Rocks and Trees Community Center.** Beattie, M. (Rocks and Trees, Inc., Middletown Springs, VT). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30351.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The building described utilizes direct gain with heat storage in mass walls and floor below and in phase change materials on the upper level. Auxiliary heating is by a wood furnace. Summer space cooling is by nocturnal cooling of the rock storage unit, as well as ventilation by high clerestory windows. Domestic hot water is provided by a solar thermosyphon system and supplemented by wood heat. Daylighting comes from direct window, clerestory, light shelf, and light well. Advantage is taken of superinsulation, earth sheltering, coniferous shelterbelt planting. (LEW)

43608 (CONF-800972—, pp 3.55-3.56) **Passive solar bank building in Minnesota.** Weidt, J.L. (John Weidt Associates, Inc., Chaska, MN). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30353.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Security State Bank is designed to use passive solar energy for a significant portion of its lighting, heating, and cooling requirements. The major passive component is a large area of south-facing glass, providing both natural lighting and passive heating. Baffles minimize glare and create diffuse light. Exterior shades and interior blinds provide local task light control, while operable exterior shades reject unwanted heat. Cooling and ventilation are accomplished by a high-volume air-moving system. The design is described, as well as predicted performance and design tools used to fine-tune the design. (LEW)

43609 (CONF-800972—, pp 3.59-3.60) **Solar atrium: a hybrid solar heating and cooling system.** Ueland, M. 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The concept being tested is a hybrid system of solar heating and cooling called solar atrium and is adaptable to residences and smaller commercial and institutional buildings. It consists of a solar room and thermal storage facility designed and equipped to capture and store solar heat in winter and to provide cooling in summer. The solar atrium was designed, constructed and is now being monitored in a demonstration model single-family house. It was constructed of materials and equipment economically and readily available with cost-effectiveness of installation and operation as a primary program objective. The monitoring is to obtain data on insulation, temperatures and fuel costs over a full year heating and cooling season. (Life cycle costs will be generated, including costs of installation, operation, and financing. Cost-effectiveness will be measured by comparing the life-cycle costs generated for the experimental model with a similar residence of conventional design without the solar atrium. Comparisons will also be made with other existing residences and with models described in other published studies).

43610 (CONF-800972—, pp 3.61-3.63) **Walker Field passive solar heating system.** Kreider, J.F. (Walker Field Airport Authority, Grand Junction, CO). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The approach developed for space heating of the Walker Field Airport Terminal involves the use of direct gain apertures facing due south with associated thermal storage in floors, walls, and a massive concrete ramp. Daylighting is provided by skylights spaced twenty feet apart and located in a stepwise fashion on the terminal roof. Cooling loads are met by evaporative cooling with solar controls. Major efforts reported include: detailed building thermal simulation using hourly computer model; expected performance calculations for passive solar heating system; expected natural daylighting contribution determined by detailed hourly computer simulations; preliminary cost estimates. (LEW)

43611 (CONF-800972—, pp 3.64) **Willow Park II Community Center.** Grant, A.T. (Willow Park II Community Improvement Association, Missouri City, TX). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30361.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The primary energy concerns identified for the community center were cooling, dehumidification, and lighting. The building is partially underground to use the 70°F earth temperature. Clerestory windows provide some passive solar heating, but their major function is daylighting. Cooling is by ventilation, and is owner controlled without automatic control modes. Publicity related to the project is discussed. (LEW)

43612 (CONF-800972—, pp 3.65-3.68) **Passive cooling program overview.** Martin, M.; Elmer, D. (Lawrence Berkeley Lab., CA). 1980. NTIS, PC A16/MF A01. Contract W-7405-ENG-48.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The past and present DOE Passive and Hybrid Cooling Program is outlined and plans for the future are discussed. The emphasis here is to provide an overview of the scope of completed and ongoing research and development in this field, and to indicate what is required in the future.

43613 (CONF-800972—, pp 3.69-3.72) **Long-term ice storage for cooling applications using passive freezing techniques.** Gorski, A.J.; Schertz, W.W. (Argonne National Lab., IL). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of the work reported is to develop a cost-effective method of solar cooling using natural ice formation in the winter to provide year-round cooling needs. A large insulated tank of water is buried underground near the building to be cooled. A series of specially designed heat pipes go from the bottom of the tank to the soil surface and project above the surface. These effect one-way heat transfer, rejecting heat from the tank to the cold air in the winter time but remaining inoperative in summer. The work reported concentrated on experimental studies that would give proof-of-concept. Cost goals have also been established. (LEW)

43614 (CONF-800972—, pp 3.73-3.74) **Cool pool: a passive cooling system.** Hammond, J. (Living Systems, Winters, CA). 1980. NTIS, PC A16/MF A01. Contract FG02-77CS34153.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Cool Pool is a shaded evaporating pool that is connected to thermal mass storage in a thermosyphon configuration. The system requires no moveable insulation. The pool is placed outside a building, and the thermal mass, vertical tubes full of water, are

inside the living space. The pool must be elevated so that its water level is as high or higher than the water level in the tubes for thermosyphoning to work properly. The pool is shaded to prevent heating by direct solar radiation. Experiments and analytical results are reported.

43615 (CONF-800972—, pp 3.75-3.77) **Global state-of-the-art of passive cooling and dehumidification, with potential applications for overheated US conditions.** Bowen, A. (Univ. of Miami, Coral Gables, FL). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

This project, in progress, is defining the state-of-the-art in passive cooling and establishing a system for recording global progress. The paper describes methods employed for obtaining this information and the recommendations, made by an international meeting of experts, for research and development in all cooling channels and systems. Future activities include an annual update of research and development, international cooperation, the development of new materials, cooling components and systems.

43616 (CONF-800972—, pp 3.78-3.79) **Performance evaluation of a passively heated and cooled solar house.** Mancini, T.R. (New Mexico State Univ., Las Cruces). 1980. NTIS, PC A16/MF A01. Contract AS03-78CS31606.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The technical feasibility of the Skytherm system for the Southwest was demonstrated. In this system a thermal mass of water contained in water bags is located on the roof structure and covered with movable insulating panels which alternately isolate or expose them to the ambient environment. The water bags communicate thermally with the house by conduction through the roof-ceiling. Performance of the Skytherm system as a heating system and a cooling system, as well as performance during interim seasons where neither heating nor cooling is required is reported. (LEW)

43617 (CONF-800972—, pp 3.80-3.83) **Skytherm natural thermal control design, production, and commercialization.** Hay, H.R.; Aiello, D.P. (Skytherm Processes and Engineering, Los Angeles, CA). 1980. NTIS, PC A16/MF A01. Contract FG03-77CS31842;FG03-78CS31825.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Skytherm Natural Thermal Control is a passive solar heating and cooling system that includes a roof pond and movable insulation. Systems are described that were designed for northern, southern, and southwestern climates. Studies reported include component research and testing, studies to confirm and expand applicability of the concept for cooling in difficult climates, certifications of design and operation considerations. These studies, preparatory to commercialization, were to lead to a cost-and-effectiveness conclusion regarding the 100% heating and cooling capability of the system and its nation-wide energy saving potential. (LEW)

43618 (CONF-800972—, pp 3.84-3.87) **Passive cooling and solar heating validation project to assist commercialization in warm humid climates.** Doderer, E.; Clark, G.; Loxsom, F.; Haves, P. (Trinity Univ., San Antonio, TX). 1980. NTIS, PC A16/MF A01. Contract AC03-79CS30201.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The project objective is to assist the commercialization of passive heating and cooling of buildings by: providing validated thermal design information for passive systems with high commercialization potential; providing accurate heat transfer and temperature data for purposes of validation of computer models of the thermal behavior of passively heated and cooled buildings; developing passive heating and cooling system concepts and assessing their performance; and identifying the operating strategies for those passive systems which maximize comfort and minimize auxiliary fuel use. When developing this information, our primary emphasis will be on warm, humid American climates.

43619 (CONF-800972—, pp 3.88-3.91) **Passive studio and case studies for design professionals.** Bremer, D. (AIA Research Corp., Washington, DC). 1980. NTIS, PC A16/MF A01. Contract AC02-79CS30120.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The AIA Research Corporation has developed a workshop program for professional designers, conducted a pilot series of eight workshops in major US cities during the Spring of 1980, and evaluated both the commercial feasibility of this workshop program and its educational effectiveness. The commercial feasibility is proven, and as a private venture, 14 more workshops have been scheduled for the Fall and early Winter this year. The educational effectiveness is outstanding: over 80% of workshop participants designed at least one passive building in the first four months since attending. Indications are their firms will be designing over $700 million worth of passive construction several years from now. AIA Research Corporation has also produced twelve case studies of non-residential passive buildings (completed or under construction) for distribution to professional designers.

43620 (CONF-800972—, pp 3.92-3.93) **Passive building climatology curriculum development.** Prowler, D.; Fraker, H. (Univ. of Pennsylvania, Philadelphia). 1980. NTIS, PC A16/MF A01. Contract AC02-79CS30241.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

In February 1980 a Request for Proposals (RFP) was issued to all the accredited schools of architecture in the United States. The RFP established the framework for the preparation of resource packages in Passive Building Climatology while stressing careful definition of specific subject areas and the importance of pedagogical methods for effective transfer of technical concepts to the design process. In early April 1980 eleven schools of architecture (out of 33 proposals) were selected to undertake the preparation of response packages. In mid-May 1980 representatives from the eleven schools, and invited consultants met to present, coordinate, and review content of packages, work plans, and schedule. An important exchange occurred concerning pedagogical methods and learning styles which helped to clarify the specifics of individual packages. Since the meeting, further detailed guidance and concerns have been communicated to the eleven schools.

43621 (CONF-800972—, pp 4.1-4.3) **Overview of the National Passive Solar Products Program.** Burke, R. (Dept. of Energy, Washington, DC); Lutha, R. 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The overall goal of the Passive Solar Products Program is the development, field testing and commercialization of common and advanced materials, components and assemblies that improve the performance, reduce costs and/or simplify the design of passive solar heating, cooling and daylighting systems. Quantitatively, the goal is to support the displacement of .11 quads of non-renewable energy, through the use of new and existing passive solar products in both new and retro-fit passive solar building applications. The building types addressed by this program include residential, commercial and agricultural. To achieve the 1986 goal, seven major objectives have been set forth: identification and characterization of materials, both existing and future in the building industry; establishment of cost and performance goals; support research and development for products that have a reasonable chance to meet or exceed cost and performance goals; support prototype development and testing to assess durability, reliability and performance evaluation; promote in-place product testing in the marketplace to assess safety and consumer acceptance; support the development of product standards throughout the consensus process; and support market research to assess market potential and needs.

43622 (CONF-800972—, pp 4.4-4.5) **VIS product development.** Gill, S. (ABRI, Inc., Cambridge, MA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Research plans are discussed and results are summarized of initial background investigations and meetings on market research, design, and field testing of a variable insulation system. (LEW)

43623 (CONF-800972—, pp 4.6-4.9) **Transwall: a modular visually transparent thermal storage wall system.** McClelland, J.F. (Ames Lab., IA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Transwall system is a modular visually transparent thermal storage wall which is placed in building areas receiving direct solar radiation. Specific accomplishments reported are: construction and operation of test-prototype Transwall modules over the winter, side-by-side comparison of the thermal performance of Transwall and Trombe wall systems in passive test rooms, revision and validation of a thermal network computer model of Transwall, a preliminary assessment of the convective heat transfer within Transwall, prediction of thermal performance as a function of design parameters for the climates of Albuquerque, Boston, and Madison, and negotiations for construction of commercial prototypes. (LEW)

43624 (CONF-800972—, pp 4.10-4.11) **Residential passive solar development and marketing.** Nichols, W.; Nichols, S. (Communico, Inc., Santa Fe, NM). 1980. NTIS, PC A16/MF A01. Contract AC04-79CS30173.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A planned unit development of 19 passive solar homes, consisting of two types, is described. The two types of passive solar home are briefly described, and include greenhouses, Trombe walls, direct gain windows, and clerestories. The houses are also load-managed by a microprocessor system. (LEW)

43625 (CONF-800972—, pp 4.12-4.13) **Application of phase change materials in passive solar systems.** Sliwkowski, J. (Inst. of Energy Conversion, Newark, DE). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A thermal wall panel has been designed, constructed, and tested. The panel is for application in passive and hybrid solar systems, and is essentially a flat-plate collector with phase change material integrated into the system. Air is used as the heat transfer fluid. Data were collected from a test house which indicate an 18% solar fraction due to the thermal wall panel. (LEW)

43626 (CONF-800972—, pp 4.15) **Passive solar greenhouse development.** 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of the work reported is to develop a glazing system which will be an efficient passive solar collector, enclosing space as a greenhouse does. Major tasks include development of a sound structure which allows double and triple glazing, an acceptable night insulation system, and an automatic ventilation and solar shading system to control temperature during the summer. (LEW)

43627 (CONF-800972—, pp 4.16-4.17) **Honeycomb thermal shade development.** Buesing, J.W.; Klodt, G.; Anderson, A. (Kool View Co., Inc., Madison, WI). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The product reported uses a honeycombed structure to create horizontal air spaces parallel to the surface of window glass. It also divides the air adjacent to the surface of the window into smaller horizontal air spaces which will minimize the adverse effects of convection and condensation. The product has been tested, and its economics are examined. (LEW)

43628 (CONF-800972—, pp 4.18-4.21) **Study of the effectiveness of selective absorber coatings and phase change materials in passive solar space heating.** Wray, W.O. (Los Alamos Scientific Lab., NM); Hyde, J.C.; Bourdeau, L.E. 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The performance of selective absorber coatings in passive solar heating systems was assessed, particularly in relation to the relative performance of thermal storage wall buildings when equipped either with a selective absorber coating or movable night insulation. Theoretical comparisons using a simulation code have been used to demonstrate that thickened phase change materials combine the advantages of water and of masonry in thermal storage walls of drastically reduced size and mass. (LEW)

43629 (CONF-800972—, pp 4.22-4.24) **Product spin-offs from MIT Solar Building No. 5.** Johnson, T.E. (Massachusetts Inst. of Tech., Cambridge). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Materials for passive solar heating derived from the MIT Solar Building No. 5 are reviewed, including selective transmitters, light-directing louvers, and lightweight thermal storage in the form of polymer concrete ceiling tiles and Glaubers salt. The performance of the building is also highlighted. (LEW)

43630 (CONF-800972—, pp 4.27-4.30) **Reflective insulating blinds for window applications.** Shapira, H.B. (Oak Ridge National Lab., TN). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A novel blind which will improve the performance of direct-gain systems is described. In the winter daytime mode the reflective surface of the blind directs solar radiation to the ceiling, decreasing the need for artificial lighting and avoiding the glare and hot spots that make flexible furniture arrangement impossible. In the winter nighttime mode, the slats are closed to form an insulating shutter. (LEW)

43631 (CONF-800972—, pp 4.31-4.34) **Modularization of passive solar.** Maloney, T. (One Design, Inc., Winchester, VA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

In order for passive solar systems to become highly marketable, packageable components need to be developed which can easily be incorporated into a building. Nowhere is the opportunity for utilization of such components greater than in the manufactured housing industry. One Design, Inc. has been involved with the Department of Energy and the Tennessee Valley Authority to find ways of modularizing component parts of passive solar systems. Site-filled water mass modules installed in south-facing stud spaces, glazing systems, sun rooms and roof apertures are being explored and constructed. Even though the houses are being designed without pre-selected sites, they are expected to perform well given the variable deployment of the south-facing wall system. Any facade of the house will be able to accept the sun's energy. While some of the soutions involve specific products and techniques, it is the general conclusion that low-cost, modular solar components can be worked into solar building designs without greater regard for the final site. This makes marketing easier and costs lower with the result of more installations.

43632 (CONF-800972—, pp 4.35-4.36) **Hog confinement farrowing-nursery building.** Porter, W.H. (W. H. Porter, Inc., Holland, MI). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30389.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective is to manufacture a farrowing-nursery building for hog confinement which uses a minimal amount of winter heat and is relatively cool in the summer. The biggest single heat loss from the building is from air changes. There is a minimum of four changes per hour in the winter to more than sixty changes per hour in the summer. It became obvious that the biggest savings in this building could be made with an air to air heat exchanger. The second savings would be made with a hot air collector. The third area of savings could be made with a wood stove in place of the backup bottle gas normally used.

43633 (CONF-800972—, pp 4.42-4.45) **Heat Mirror transparent insulation.** Hodge, M.H. (Southwall Corp., Palo Alto, CA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Heat Mirror is a transparent insulation that transmits short wave solar radiation while reflecting longer wave length thermal radiation. The Heat Mirror is compared with glass and solar control films, and its performance is discussed. Also discussed are payoff for building owners and homeowners, comfort, and impact of the technology on the insulating glass industry. (LEW)

43634 (CONF-800972—, pp 4.48-4.51) **Weather Bubble.** Chahroudi, D. (Suntek Research Associates, Corte Madera, CA). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

A novel method of solar space heating is presented which consists of making the entire building's surface out of transparent insulation and optical shutter. The operation and construction are described and approximate thermal, cost, and benefit calculations are made. It is shown that a functioning Weather Bubble could be made with existing materials and processes for an erected sales price of about $6 per square foot of covered area. A bubble would pay for itself by either its shelter or its heating function alone.

43635 (CONF-800972—, pp 4.52) **Sunup: a dormitory for Colorado Rocky Mountain School.** (Thermal Technology Corp., Snomass, CO). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The CRMS dormitory was designed to be a comprehensive demonstration of the possibilities of energy conscious design. The goal was to design a comfortable building which would use as little energy as possible and which would supply its energy needs in several innovative ways so as to be as self-sufficient as possible. In addition it was to serve as an educational device both to its occupants, giving them an awareness of what it takes to be comfortable, and to the community at large, demonstrating that passive solar and other alternative energy sources can be successfully incorporated into an institutional building.

43636 (CONF-800972—, pp 4.53-4.54) **Passive solar construction handbook.** Winter, S.; Levy, E.; Evans, D.; Gardstein, C. (Steven Winter Associates, Inc., New York, NY). 1980. NTIS, PC A16/MF A01. Contract AC02-79CS30166.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of this project is to develop a Handbook of construction details, using commercially available products, for passive solar residential applications. It is intended that the Handbook effectively bridge the information gap between the technical state-of-the-art in passive solar design and standard practice in single-family residential construction. The Handbook is intended to provide information primarily for single-family detached residential construction, although some of the material is also applicable to multi-family housing. It is also intended to be modular in format in order to allow for elaboration of existing data and for inclusion of completely new information at some point in the future. At present the Handbook focusses on construction and performance information for four basic materials: brick, concrete, concrete masonry, and fenestration (glass and plastic). Additional elements such as insulation, shading devices, and alternative construction materials are intended to be added.

43637 (CONF-800972—, pp 5.12-5.16) **Solar greenhouse retrofit on roof of five-story tenment (low-income sweat equity coop) in East Harlem, N.Y.C.** Dearborn, H. (Energy Task Force, Inc., New York, NY). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The sweat equity housing program was developed in New York City to help low-income people to own their housing by pooling together their labor resources as equity instead of capital. The objective of the work reported was to construct on the roof top of one such building a prototypical commercial greenhouse to be operated and maintained by a reformed street gang. The greenhouse was to employ principles of solar energy and energy conservation in order to minimize operating costs and at certain times of the year to contribute to the heating requirements of the building. A six person crew was trained to construct the greenhouse, and two were trained to operate and maintain the greenhouse, including developing outlets for selling plants and vegetables. (LEW)

43638 (DOE/CS/30211—01) **Active solar heating-and-cooling system-development projects.** (Planning and Management Associates of Greater Washington, Inc., DC (USA)). Oct 1980. Contract AC03-80CS30211. 272p. NTIS, PC A12/MF A01. Order Number DE83008314.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Department of Energy (DOE) projects with industry and academic institutions directed toward the development of cost effective, reliable, and publically acceptable active solar heating and cooling systems are presented. A major emphasis of the program is to insure that the information derived from these projects is made available to all members of the solar community who will benefit from such knowledge. The purpose of this document is to provide a brief summary of each of the 214 projects that were active during Fiscal Year 1980, and to provide sufficient information to allow the reader to acquire further details on specific projects. For clarity and convenience, projects are organized by either the program element or technology group as follows: (1) Program elements - Rankine Solar Cooling Systems; Absorption Solar Cooling Systems; Desiccant Solar Cooling Systems; Solar Space Heating Systems; Solar Hot Water Systems; Special Projects; and (2) Technology Groups - Solar Collector Technology; Solar Storage Technology; Solar Controls Technology; Solar Analysis Technology; and Solar Materials Technology. For further convenience, this book contains three indices of contracts, with listings by (1) organization, (2) contract number and (3) state where the project is performed. A brief glossary of terms used is also included at the end of the book.

43639 (DOE/R5/10325—T1) **Water storage tube system. Phase 2. Final project report.** (Dynamic Plastics, Inc., New Paris, OH (USA)). 30 Apr 1983. Contract FG02-81R510325. 43p. NTIS, PC A03/MF A01. Order Number DE83015266.

Portions are illegible in microfiche products.

A discussion is given of tests completed on three water storage wall systems: SUNBEAMS, horizontal fiberglass water tubes; SUNLOUVERS, louvers inserted into vertical or horizontal clear fiberglass water tubes; and TANKWALL, fiberglass waterwall thermal storage tanks.

43640 (DOE/R5/10325—T2) **Passive-solar simulation analysis.** (Miami Univ., Oxford, OH (USA). Dept. of Architecture). 5 Dec 1982. Contract FG02-81R510325. 50p. NTIS, PC A03/MF A01. Order Number DE83014926.

Portions are illegible in microfiche products.

A passive solar heating component (TANKWALL) was developed. TANKWALL is a fiberglass water wall, selective surfaced, solar absorption, thermal storage tank. Testing of the thermal performance of TANKWALL was performed which included a series of room and instrumentation calibration tests and several comparison experiments where TANKWALL was operated side-by-side with other passive solar configurations. Relevant effective heat transfer values (solar absorptance, capacitance, conductance) were derived using a thermal network computer model and data from the above experiments. Then using these heat transfer values, three hour-by-hour computer simulations were run for a proto-typical passive solar house using various solar systems and standard hourly weather data. The subject house had a Building Load Coefficient of 8899.2 Btu/H, a vertical south facing 200 sq. ft. collector, and a Load/Collector Ratio of 44.5. It was found that the TANKWALL with selective surface performs significantly better in the Dayton, Ohio area than either the painted 12 inch Trombe wall or the painted TANKWALL with R-4.5 night insulation.

43641 (EPRI-AP—2884-SR, pp 3.1-3.8) **Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar.** DeDuck, P.F.; Siegel, M.D.; Wood, R.A. (JBF Scientific Corp., Wilmington, MA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

A multiyear project was undertaken to assess utility impacts and to establish the requirements for preferred passive solar buildings, with special emphasis on single family detached homes. A preferred design minimizes the owner's total expenditures for heating and cooling and also provides favorable impacts upon the utility. The utility impacts are quantified in economic terms and are used to represent the costs a homeowner pays for backup energy. These costs are then combined with the costs of owning a passive solar building. A computer model has been used to simulate and compare the energy performance of passive solar homes to a conventional home with limited insulation and to a well-insulated home. Another computer program aggregates the results of these comparisons to large numbers of homes and modifies the utility system load of a given utility to reflect the changes in energy use. The modified system load is compared to a reference system load with the aid of a production cost and generation reliability assessment program. Comparisons are made in relation to kWh use, load shape, fuel costs, and generation system reliability. Key elements of the project are highlighted.

43642 (NP—3770141) **Solar energy for hot water preparation and space heating. Pt. 1.** Hemmers, R.; Hoetzel, C. (Fachinformationszentrum Energie, Physik, Mathematik G.m.b.H., Bonn (Germany, F.R.). Buero Bonn). Jun 1982. 228p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83770141.

Portions are illegible in microfiche products.

The new edition of the BINE information packet deals with the principles of solar engineering with regard to hot water preparation plants and heating systems. The book is divided into 8 chapters. Ch.1: principles of solar energy conversion; ch.2: energy-orientated planning of buildings; ch.3: solar collectors and heat storage; ch.4: solar heating systems; ch.5: financial support for solar plant construction; ch.6: bibliographic references; ch.7: research institutions and organizations working in the field of solar engineering; ch.8: index of technical terms with explanations.

43643 (NP—3770183) **Briefing package: Solar energy for hot water preparation and space heating. Pt. 2.** Hemmers, R.; Hoetzel, C. (Fachinformationszentrum Energie, Physik, Mathematik G.m.b.H., Bonn (Germany, F.R.). Buero Bonn). Jun 1982. 171p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770183.

Portions are illegible in microfiche products.

The present BINE information packet introduces new testing plants and projects subsidized by the Bundesminister fuer Forschung und Technologie (BMFT). Each chapter deals with the solar houses of Aachen, Essen and Freiburg: Their energy-saving design, the single solar components as collectors and heat storage devices in combination with conventional heating systems and the operating experiences are described. These explanations are concluded by a technical contribution concerning the demonstration house of the Fachhochschule Luebeck which also serves for the practical testing of solar plants. The demonstration project of Landstuhl is distinguished from the single testing plants and named so far. Here, up to 60 solar houses are to be built in the course of disclosing a newly built residential area. An optimal synthesis of solar engineering and solar architecture is aimed at in order to be as independent as possible from conventional heating systems.

43644 (NP—3902518) **End-use research status report, April 1, 1983-June 30, 1983.** (Public Service Co. of New Mexico, Albuquerque (USA)). 1983. 26p. NTIS, PC A03/MF A01. Order Number DE83902518.

The Public Service Company of New Mexico's (PNM) Energy Management Section and Commercial Energy Services Section perform end-use (customer side of the meter) technical applications research. The purpose of this research work is to investigate the operating characteristics and possible customer and utility benefits of the various commercially available end-use technologies. This work enables PNM to supply its customers with accurate information regarding these technologies. A status report of the research projects is given.

43645 (SERI/TP—252-1922) **Performance prediction of attached sunspaces.** Parsons, B.K.; Beckman, W.A.; Klein, S.A. (Solar Energy Research Inst., Golden, CO (USA); Wisconsin Univ., Madison (USA). Solar Energy Lab.). May 1983. Contract AC02-77CH00178. 6p. (CONF-830622—22). NTIS MF A01. Order Number DE83011966.

From American Solar Energy Society meeting; Minneapolis, MN, USA (1 Jun 1983).

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

A detailed hourly computer routine which models the thermal response of a building-attached sunspace has been developed for use with the TRNSYS simulation system (1). The model is described, and monthly results are compared to the Solar-Load Ratio method (2). Parametric studies demonstrate the effects of venting the sunspace air to the building, lowering the allowable sunspace air temperature and both venting and shading the sunspace to reduce summer cooling. Both insulated and masonry common wall systems are considered in these parametric studies.

1410 Solar Collectors And Concentrators

REFER ALSO TO CITATION(S) 43546, 43625, 43628, 43642, 43643

43646 (DOE/ER/04996—4) **Development of materials for a luminescent solar collector. Final report, September 1, 1979-December 31, 1982.** Andrews, L.J.; McCollum, B.C.; Stone, S.; Guenther, D.E.; Murphy, G.J.; Lempicki, A. (GTE Labs., Inc., Waltham, MA (USA)). Jan 1983. Contract AC02-78ER04996. 94p. NTIS, PC A05/MF A01. Order Number DE83015026.

The optical absorption and fluorescence have been characterized for a broad range of vitreous and ceramic transparent inorganic materials doped with trivalent chromium ion. The aim was to identify a Cr^{3+} host which is susceptible to economical mass production and which could simultaneously satisfy the stringent long-term stability and spectroscopic requirements of the luminescent solar collector. Completely vitreous materials were found to be deficient because of unacceptably low Cr^{3+} fluorescence quantum yields which could not be circumvented by radiationless energy transfer to a lanthanide ion. In order to overcome this problem of low quantum yield, a new class of luminescent solid based on transparent glass ceramic technology had to be developed. In particular, transparent glass ceramics which precipitate the crystalline aluminosilicate mullite were found to be excellent hosts for Cr^{3+} which have quantum yields of at least 50 +- 10%. Currently, these mullite ceramics are by far the most advanced wholly inorganic material developed for the collector application and represent the first example of a new type of luminescent solid which can be extended to include many other crystalline ceramics and transition metal ions.

43647 **(SP-RAPP—1982-18) Thermal performance of solar collectors. Three years of outdoor exposure of eleven different products.** Ekstroem, L.A. (Statens Provningsanstalt, Boraes (Sweden)). 17 Aug 1982. 102p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750776.

Portions are illegible in microfiche products.

The testing institute has investigated the influence of climate on 11 different solar collectors. The collectors have been mounted on a roof for 3 years without circulating fluid to accelerate ageing. Thereafter the efficiency of the collectors has been measured and the components have been inspected. It was found that the efficiency was only slightly lower than for new specimens. Some particular defects were found such as destroyed layers on absorbers and yellowing of a plastic sheet. The general conclusion is that the collectors have managed the outdoor situation quite well and the test will be prolonged.

43648 **Systematic rotation and receiver location error effects on parabolic trough annual performance.** Treadwell, G.W.; Grandjean, N.R. (Sandia National Laboratories, Albuquerque, NM 87185). *Journal of the Society of Environmental Engineers;* **104**: No. 4, 345-348(Nov 1982).

This report deals with the effects of certain systematic errors on performance and, therefore, their influence on the design of troughs. Systematic rotation error is the angle between the reflector vertex-focus axis and the vertex-sun axis; systematic receiver location error is the vectorial deviation of a receiver from focus. The existence of systematic rotation errors and systematic receiver location errors can have a significant effect on the annual performance of parabolic trough collectors. These systematic errors can exist in addition to errors which are random in nature and which, therefore, can be treated statistically. Systematic rotation errors of 16 milliradians result in annual performance degradation of greater than 30 percent. Systematic receiver location errors can have a similar effect depending upon magnitude. The technique for calculating the influence of systematic errors on performance is outlined and methods of identifying and minimizing these errors are suggested.

43649 **An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures.** Fruchter, E.; Grossman, G.; Kreith, F. (Faculty of Mechanical Engineering, Technion-Israel Institute of Technology, Haifa, Israel). *Journal of the Society of Environmental Engineers;* **104**: No. 4, 340-344(Nov 1982). Contract W-7405-ENG-26.

This paper describes the design, construction, and testing of a concentrating solar collector based on the Stationary Reflector/Tracking Absorber (SRTA) principle. The system consists of a fixed, 2.5-m dia, spherical mirror which focuses solar radiation on a movable, cylindrical absorber tracking the sun. This work is an extension of earlier tests with a similar collector in which output temperatures up to 150°C were obtained with water. The present system, using a mineral-oil-based heat transfer fluid, was capable of heating the fluid up to 300°C under steady-state conditions. The direct radiation efficiency ranged from 50 percent at low temperatures up to 30 percent near 300°C, showing the SRTA to be an effective concentrating collector for the intermediate temperature range which can be constructed at relatively low cost.

1420 Heat Storage

REFER ALSO TO CITATION(S) 43478, 43625, 43628, 43629, 43642

43650 (CONF-800972—, pp 4.14) **Phase change materials in masonry construction.** Lang, M. (Inst. of Energy Conversion, Newark, DE). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting: Washington, DC, USA (21 Sep 1980).

43651 **(SERI/STR—231-1860) New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report.** Petri, R.; Ong, E.T.; Claar, T.D.; Marianowski, L.G. (Institute of Gas Technology, Chicago, IL (USA)). Apr 1983. Contract AC02-77CH00178. 81p. (DE—83011967). NTIS, PC A05/MF A01. Order Number DE83011967.

This report presents the results of an investigation into the feasibility of an advanced concept of composite salt/ceramic storage media for high-temperature solar thermal storage applications. This novel approach involves retention and immobilization of phase-change salts within porous ceramic matrices by capillary action. Composite media pellets, bricks, or other suitable shapes may be used in direct-contact heat recovery/storage applications with compatible fluids, thus eliminating the expensive heat exchanger tubes required in molten-salt storage systems utilizing shell-and-tube designs. Higher heat transfer rates are also expected because the thickness of solidified salt zones can be controlled and minimized.

15 GEOTHERMAL ENERGY

43652 **(LBL—3220-Vol.1) Compilation of geothermal information: exploration.** (Lawrence Berkeley Lab., CA (USA)). 1978. Contract W-7405-ENG-48. 445p. NTIS, PC A19/MF A01. Order Number DE83014991.

Portions are illegible in microfiche products.

The Database for Geothermal Energy Exploration and Evaluation is a printout of selected references to publications covering the development of geothermal resources from the identification of an area to the production of elecric power. This annotated bibliography contains four sections: references, author index, author affiliation index, and descriptor index.

1501 Resource Status And Assessment

43653 **(MTR—82W79) FORSITE, a multiple-project management system: overview and general description.** Entingh, D.J.; Bernstein, A.J.; Gerstein, R.E.; Kenkeremath, L.D.; Gould, A.V. (Mitre Corp., McLean, VA (USA)). Oct 1982. Contract AC01-81RA50563. 38p. NTIS, PC A03/MF A01. Order Number DE83015124.

The Geothermal Site Development Forecasting System (FORSITE) is a computer-based multiproject monitoring, scheduling, and forecasting system. Its main purpose is to assist DOE geothermal program managers in monitoring the progress of multiple geothermal electric exploration and construction projects. The system actively combines conceptual project development schedules with site-specific status data to predict a time-phased sequence of development likely to occur at multiple specific geothermal sites. The forecasting capabilities of the model include estimation of industry costs and federal manpower requirements across sites on a year-by-year basis.

1502 Geology And Hydrology Of Geothermal Systems

REFER ALSO TO CITATION(S) 44691

43654 **(NP—3902520) Thermopolis hydrothermal system, with an analysis of Hot Springs State Park. Preliminary report No. 20.** Hinckley, B.S.; Heasler, H.P.; King, J.K. (Wyoming Univ., Laramie (USA). Dept. of Geology and Geophysics). 1982. 56p. The Geological Survey of Wyoming, Box 3008, University Station, Laramie, WY 82071.

Thermopolis is the site of Hot Springs State Park, where numerous hot springs produce nearly 3000 gallons per minute (gpm) of 130°F (54°C) water. The University of Wyoming Geothermal Resource Assessment Group has studied a 1700-square-mile area centered roughly on the State Park. Available literature, bottom-hole temperatures from over 400 oil well logs, 62 oil field drill stem tests, the Wyoming State Engineer's water well files, 60 formation water analyses, thermal logs of 19 holes, and field investigations of geology and hydrology form the basis of this report. Analysis of thermal data reveals that temperatures of up to 161°F (72°C) occur

along the crest of the Thermopolis Anticline within 500 feet of the surface. The hydrology and heat flow of these geothermal anomalies was studied.

43655 **Changes in compressional and shear wave velocities and dynamic moduli during operation of a hot dry rock geothermal system.** Pearson, C.F.; Fehler, M.C.; Albright, J.N. (Earth and Space Sciences Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Geophysical Research;* 88: No. B4, 3468-3475(10 Apr 1983).

Compressional and shear velocities measured during cross well seismic surveys are found to decrease during operation of a hot dry rock geothermal system. The relative P and S wave velocity decrease is very close to values predicted by O'Connell and Budiansky (1974), who modeled velocities in rocks containing fluid-saturated and dry cracks. Because our data fit their model quite well, we attribute the velocity decrease to an increased density of the fluid-filled fractures in the reservoir. Fracture density parameters of O'Connell and Budiansky range as high as 0.365 near the main heat transfer areas of the geothermal reservior. The dynamic shear and Young's modulus are significantly lower near the principal reservoir. The dynamic shear and Young's modulus are significantly lower near the principal heat transfer surfaces, but the bulk modulus is largely unaffected. These observations suggest that the velocity differences are caused by fully saturated fractures. We demonstrate that the fractures inferred by this survey may have lengths as large as 70 cm. These fractures may have been caused by shear failure, microcracking associated with thermal drawdown, or thermal stress cracking.

1503 Geothermal Exploration And Exploration Technology

REFER ALSO TO CITATION(S) 43654

43656 **(LBL—15526) Electromagnetic soundings over a geothermal reservoir in Dixie Valley, Nevada.** Wilt, M.J.; Goldstein, N.E. (Lawrence Berkeley Lab., CA (USA)). Apr 1983. Contract AC03-76SF00098. 71p. NTIS, PC A04/MF A01. Order Number DE83015355.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An electromagnetic (EM) sounding survey was performed over a region encompassing the Dixie Valley geothermal field with the purpose of mapping the subsurface resistivity in the geothermal field and its surroundings. The EM survey consisted of 19 frequency-domain depth soundings made with the EM-60 system using three separate horizontal-loop transmitters, and was designed to explore a narrow region adjacent to the Stillwater Range to a depth of 2 to 3 k. Most sounding curves could be fitted to three-layer resistivity models. The surface layer is moderately conductive (10 to 15 ohm-m), has a maximum thickness of 500 m, and consists mainly of alluvial fan and lake sediments. More conductive zones are associated with hydrothermally altered rocks; a resistivity high may be associated with siliceous hot spring deposits. The conductive second layer (2 to 5 ohm-m) varies in thickness from 400 to 800 m and thickens toward the center of the valley. This layer probably consists of lacustrine sediments saturated with saline waters. Local resistivity lows observed in the second layer may be related to elevated subsurface temperatures. This layer may act as a cap rock for the geothermal system. Resistivities of the third layer are high (50 to 100 ohm-m) except in a narrow 5-km band paralleling the range front. This low-resistivity zone, within volcanic rocks, correlates well in depth and location with reported zones of geothermal fluid production. It also seems to correlate with the western margin of a concealed graben structure previously inferred from other geophysical data.

43657 **(LUTVDG/(TVGL—3012)/1-31/1981) Preparatory investigation for geothermal heat pump plant in the commune of Landskrona.** Bjelm, L.; Persson, P.-G. (Tekniska Hoegskolan, Lund (Sweden). Institutionen foer Teknisk Vattenresurslaera). Jun 1981. 32p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750853.

Portions are illegible in microfiche products.

The boreholes give evidence of Campan sandstone in the depth of 630 m. The sandstone and the rest of the formation are estimated to possess good quality as a reservoir. At least 100 l water per sec could be brought out at a temperature of 25 degrees C and a heating capacity of approximately 6 MW could be achieved by a heat pump having Δ=15 degrees C. A two-hole system with the distance of 1000 m might represent an operational period of 50 years. Therefore the construction of a geothermal plant is recommended.

43658 **(USGS-OFR—79-662) Deep-drilling data, Raft River geothermal area, Idaho: Raft River geothermal production well No. 4.** Covington, H.R. (Geological Survey, Denver, CO (USA)). 1979. 28p. Geological Survey Open File Service, Box 25425, Denver Federal Center, Denver, CO 80225.

1504 Legal And Institutional Aspects

43659 **(MTR—82W73) Geothermal Progress Monitor: system status and operational experience.** Gerstein, R.E.; Kenkeremath, L.D.; Murphy, M.B.; Entingh, D.J. (Mitre Corp., McLean, VA (USA)). Mar 1982. Contract AC01-81RA50563. 28p. NTIS, PC A03/MF A01. Order Number DE83015122.

The Geothermal Progress Monitor (GPM) is an information system designed and implemented by the MITRE Corporation on behalf of the Division of Geothermal and Hydropower Technology (DGHT, formerly Division of Geothermal Energy) of the US Department of Energy (DOE). Its purpose is to keep track of and to report significant events and trends in the US geothermal industry and the federal geothermal program. The information sources of the GPM system are paper and computerized files maintained by a number of organizations throughout the United States. Trade and technical publications are also used to supplement the information-gathering network. Periodic reports from the GPM system consist mainly of manual and computerized analyses of the collected data. In addition, significant events and activities are usually highlighted. The GPM serves a dual function for DGHT and other members of the Interagency Geothermal Coordinating Council (IGCC). It supports effective management of the federal geothermal program and it provides information for executive, legislative, statutory, and public needs. This paper is a report on the current status of the GPM system and a summary of MITRE's operational experience during calendar year 1981 and the first quarter of 1982. It includes a description of the required output and the mechanism by which the information is gathered, integrated, and published as a Geothermal Progress Monitor Report.

1505 Economic And Financial Aspects

43660 **(DOE/ID/01756—2) Regional operations research program for commercialization of geothermal energy in the Rocky Mountain basin and range. Final technical report, January 1980-March 1981.** (New Mexico State Univ., Las Cruces (USA). New Mexico Energy Inst.). Jul 1981. Contract AS07-78ID01756. 148p. NTIS, PC A07/MF A01. Order Number DE83015294.

Portions are illegible in microfiche products.

This report describes the work accomplished from January 1980 to March 1981 in the Regional Operations Research efforts for the Rocky Mountain Basin and Range Geothermal Commercialization Program. The work included continued data acquisition and extension of the data base, enhancement and refinement of the economic models for electric and direct use applications, site-specific and aggregated analyses in support of the state teams, special analyses in support of several federal agencies, and marketing assistance to the state commercialization teams.

43661 **(NMEI—61-26) Consumer-behavorial analysis of alternate-energy adoption: the case of geothermal energy in New Mexico. Final report, 6/1/80-8/1/81.** McDevitt, P.; Pratt, E.; Michie, D. (New Mexico State Univ., Las Cruces (USA). New Mexico Energy Inst.). Aug 1981. Contract AS07-78ID01756. 161p. NTIS, PC A08/MF A01. Order Number DE83015296.

The overall objectives of the research described here are the determination of the market penetration prospects of geothermal energy in New Mexico and the identification of the key determinants of geothermal adoption by prospective consumers. The resources considered are intermediate temperature (65°C ≦ T ≦ 150°C) hydrothermal resources, and the applications examined are direct (non-electric) uses. In order to achieve the overall research objectives, four specific work tasks were undertaken: the design of a marketing research instrument for investigating prospects for the market penetration of geothermal energy; the implementation of the marketing research instrument through a pilot study of adoption behavior of prospective consumers of geothermal energy in the state of New Mexico; the identification and evaluation of market considerations which will affect the commercialization of direct geothermal applications within the state; and the design of a comprehensive marketing program to maximize the commercialization of geothermal energy in New Mexico.

1508 Geothermal Power Plants

REFER ALSO TO CITATION(S) 43657

43662 **(EGG—2208) Raft River binary-cycle geothermal pilot power plant final report.** Bliem, C.J.; Walrath, L.F. (EG and G Idaho, Inc., Idaho Falls (USA)). Apr 1983. Contract AC07-76ID01570. 88p. NTIS, PC A05/MF A01. Order Number DE83014808.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The design and performance of a 5-MW(e) binary-cycle pilot power plant that used a moderate-temperature hydrothermal resource, with isobutane as a working fluid, are examined. Operating problems experienced and solutions found are discussed and recommendations are made for improvements to future power plant designs. The plant and individual systems are analyzed for design specification versus actual performance figures.

43663 **(MTR—82W159) FORSITE, a multiple-project management system: production of critical-path development schedules for geothermal electric-power-generation projects.** Bernstein, A.J.; Entingh, D.J.; Gerstein, R.E.; Gould, A.V. (Mitre Corp., McLean, VA (USA)). Oct 1982. Contract AC01-81RA50563. 88p. NTIS, PC A05/MF A01. Order Number DE83015123.

Portions are illegible in microfiche products.

FORSITE is an advanced project monitoring software system that is designed to track and forecast the development of multiple projects. This paper describes the organization and operation of the FORSITE system including its overall structure and the functional relationships between its files and data bases. The paper also illustrates the operation of the system with an example of a generic critical-path management schedule produced by FORSITE. A program listing and schedule summaries are included as appendices.

1509 Geothermal Engineering

43664 **(BNL—33129) New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report.** Lagow, R.J. (Exfluor Research Corp., Austin, TX (USA)). Dec 1982. Contract AC02-76CH00016. 77p. NTIS, PC A05/MF A01. Order Number DE83014424.

Portions are illegible in microfiche products.

Saturated ethyllenic elastomers having a range of methyl group substitution, and a range of partial fluorine substitution were screened. Elastomers based on vinylidene fluoride hexafluoropropylene (VDFHFP) and those based on tetrafluoroethylenepropylene (TFEP) (alternating) were successfully cross-linked by electron-beam radiation and fluorinated to yield elastomeric products, but those based on ethylene-propylene-diene (EPDM) elastomer became brittle after fluorination. The best products were evaluated using tensile strength, elongation at break, solvent swelling, thermogravimetric analysis and infrared. A wide range of carbon-black filled compositions using the TFEP elastomer were cross-linked. The compositions were then fluorinated at or near room temperature for extended periods of time. After fluorination the samples were subjected to geothermal brine at 300°C. The best carbon-black filled composition again lasted at least 100 days in the geothermal brine. This filler-elastomer composition was chosen for use in the production of 0-rings. The 0-rings were produced by compression molding using a 30 ton hydraulic press. Various sizes of 0-rings were produced ranging fro 0.8 to 2.0 inches in diameter and from 1/16 to 3/16 inches in width. The final 0-rings were cross-linked at 40 Mrad and fluorinated under the optimized conditions developed for the samples.

43665 **(SAND—83-0278) Modeling and analysis of drag-bit cutting.** Swenson, D.V. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 85p. NTIS, PC A05/MF A01. Order Number DE83015634.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report documents a finite-element analysis of drag-bit cutting using polycrystalline-diamond compact cutters. To verify the analysis capability, prototypic indention tests were performed on Berea sandstone specimens. Analysis of these tests, using measured material properties, predicted fairly well the experimentally observed fracture patterns and indention loads. The analysis of drag-bit cutting met with mixed success, being able to capture the major features of the cutting process, but not all the details. In particular, the analysis is sensitive to the assumed contact between the cutter and rock. Calculations of drag-bit cutting predict that typical vertical loads on the cutters are capable of forming fractures. Thus, indention-type loading may be one of the main fracture mechanisms during drag-bit cutting, not only the intuitive notion of contact between the front of the cutter and rock. The model also predicts a change in the cutting process from tensile fractures to shear failure when the rock is confined by in-situ stresses. Both of these results have implications for the design and testing of drag-bit cutters.

17 WIND ENERGY

43666 **(BEOP—4) Perspectives for wind energy in the Netherlands. National research programme 1976-1981. Results and recommendations.** (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Apr 1981. 135p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Possibilities for the utilization of wind energy in the Netherlands are reviewed. Aspects as wind supply, available types of wind turbines, site selection, centralized applications where large wind turbine parks are used for the input of electricity into the utility power grid as well as decentralized applications, where smaller single wind turbines are used, mainly for space heating (greenhouses) or draining purposes (polders). Appendices include computations on the efficiency of wind turbine parks, rotor blade loads and effects of vibrations.

43667 **(BEOP—7) National development program Wind energy. Proposal for the years 1981 to 1990.** (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Oct 1981. 60p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Dutch government is advised to continue research and investigations on the application of wind energy in the Netherlands. Following topics should be investigated: design, construction and testing of large and small wind turbines, development of suitable energy storage systems and conversion systems, development of large wind power plants for input into the public utility grid, decentralized systems and off-shore siting of wind power plants. Financing should mainly be done by the government, however indus-

try, universities, electricity boards and local authorities could contribute to the costs.

43668 **(BEOP—8) Wind energy in the Netherlands.** de Boer, A.A.; Piepers, G.G.; Smit, J. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jan 1982. 24p. Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Brief survey is given of the activities related to the Dutch National research programme on wind energy 1976-1981, a programme to evaluate the possibilities of utilization of wind power. Taken into account are factors like wind supply, available wind turbine types (25 m horizontal axis wind turbine; 8 m horizontal axis wind turbine with tip vanes and a 5 m vertical axis Darrieus wind turbine). Wind energy can be generated by large wind turbines in wind parks (centralized applications) or by single smaller wind turbines (decentralized applications). The expected contribution of centralized application where electric power is directly fed into the public electricity grid will not exceed 650 MW, unless energy storage systems are developed and applied. The use of smaller wind turbines will mainly save liquid fuel, not electric power. More details are given in the final report of the national programme (BEOP-4, April 1981; in Dutch).

43669 **Wind energy systems. Vol. 2.** Bedford, England; BHRA Fluid Engineering (1982). 466p. (CONF-820922—Vol.2).

From 4. international symposium on wind energy systems; Stockholm, Sweden (21 Sep 1982).

Individual papers were abstracted separately.

43670 **(RISLEY-Trans—4334) Energy from the wind.** Goethals, R. Translated from *Recherche ;* No. 109, 262-271(1980). 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902215.

Portions are illegible in microfiche products.

Techniques used to exploit wind energy are briefly described and current programs in various countries are discussed. The wind resource is described, and the development of horizontal and vertical axis wind turbines and of large wind mills is discussed. The principles of operation of a windmill are described briefly. (LEW)

1701 Availability (climatology)

REFER ALSO TO CITATION(S) 43717

43671 **(CONF-8210136—) Seminar and status report 'wind energy'.** (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.); Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Projektleitung Energieforschung). 1982. 542p. (In German). NTIS (US Sales Only), PC A23/MF A01. Order Number DE83770001.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Portions are illegible in microfiche products.

The partial programme 'Utilization of Wind Energy' of the programme 'Energy Research and Technologies' is described on the seminar by the reports about the current projects of the Federal Government which are subsidized by the Federal Ministry for Research and Technology. The 29 lectures report on meteorological studies, fundamental research, pilot projects, and profitability calculations. Each of the 29 lectures is summarized by an abstract.

43672 (CONF-8210136—, pp vp) **Evaluation of wind measurements in great altitude for the site of GROWIAN.** Tetzlaff, G.; Franke, W.; Theunert, S.; Trapp, R. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Values measured on the site planned for the wind power plant Growian were registered and evaluated as two- minute-mean values. These data permitted an insight into the local wind situation and allowed to make an estimate of the available wind energy. Measurements were carried out at four levels, of a wind measurement pole of 150m altitude. Frequency distribution of the wind velocities clearly show the seasonal increase of natural energy potential in 100 m altitutde from 257 KWh/m² in September to 806 kWh/m² in November 1981. The degree of utilization depends on the working point of the wind converter used and on the performance coefficient especially in the partial load range.

43673 (CONF-8210136—, pp vp) **Simultaneous wind speed measurements in different altitudes with high time resolution for the specification of large wind energy converters.** Obermair, G.M.; Berberich, K.; Beckroege, W.; Jarass, L. 1982. (In Germany). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

For designing large wind energy plant including their control- and regulation-systems one needs to carry out series of measurements on the given wind field with a time resolution of about one second on different levels of altitude, this includes also the registering of extreme wind values. Few studies fulfill these requirements as most of the long-term meteorological wind measurements supplied data only in time intervals of 1 hour down to about 10 minutes. In order to answer a number of questions a long-term series of simultaneous wind velocity measurements were carried out at different altitutdes. Measuring instruments for recording wind velocities were installed at two radio masts, one in the coastal area of East Freesia, the other one on the river Danube near Keilberg. The report deals with data acquiring and evaluation of measured values.

43674 (CONF-8210136—, pp vp) **Wind situation in coastal areas of the Federal Republic of Germany with regard to wind energy utilization (especially planning of compound systems).** Schmidt, H. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Problems of extrapolating wind data on higher altitudes are looked into and attempts to determine the power capacity of compound systems of wind energy plants are described. Effects of variations of the stratifications due to day time on the vertical profile of the wind velocities of sea and land-based measuring stations are considerable. This is shown for several altitudes and wind converter types which are distributed over the region of North Germany. The advantage of a compound system of wind power plants is that the effects of strong and light wind can be balanced. It is shown that compound systems of wind converters whose components are situated in the centres of the several wind climates have the greatest possible efficiency. The smallest compound systems which belong to one wind climate exclusively.

43675 (CONF-8210136—, pp vp) **Wind situation in overseas countries with regard to utilization of wind power as a means of promoting exports of the German industry.** Wagner, V. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

The study's task is to find out which areas overseas would be suitable for the construction of larger wind power plants. It was meant to provide reliable information on climates to the export-oriented German industry. Apart from the optimum utilization of the wind available data are collected on wear- and environmental resistance with regard to requirements to the material which will be used for wind power plants. About 50 sites in Africa, the Far-East and South America were examined from an economic point of view, and areas relevant for wind utilization were studied preferentially. Compared to the North German coastal areas the energy yield from the wind areas of the regions studied lies between 4 and 75 percent. Therefore only a few of the regions are suitable for the generation of electric energy and feeding these energy into compound networks.

43676 **(NE-VIND—82-38) Structure of turbulence at Maglarp 1.** Smedman, A.S.; Bergstroem, H. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Jun 1982. 36p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750780.

Portions are illegible in microfiche products.

The measurement of wind has been supplemented by turbulence characteristics. Hot-wire anemometer has been used and the three components of the wind have been measured, namely its direction, temperature and humidity. The recording was made digitally 20 times per sec on a 9 channel magnetic tape. The normalized spectra are presented on diagrams.

1703 Regulations

43677 **(BEOP—12) Regulations for wind turbines. Inventory and proposals.** (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1982. 66p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

The existing regulations on wind turbines are surveyed. Suggestions are made to complete them. Special attention is paid to construction, safety, nuissance, electrotechnical aspects.

1704 Economics

43678 **(SERI/TP—214-1976) Wind-energy systems for electric utilities: a synthesis of value studies.** Hoock, S.; Flaim, T. (Solar Energy Research Inst., Golden, CO (USA)). May 1983. Contract AC02-77CH00178. 11p. (CONF-830622—23). NTIS, PC A02/MF A01. Order Number DE83011968.

From American Solar Energy Society meeting; Minneapolis, MN, USA (1 Jun 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The results from five major studies that assess the value of wind-energy-conversion systems (WECS) to 14 electric utilities have been normalized by a set of standard economic assumptions to facilitate comparisons across studies. The results indicate that WECS breakeven value is highly dependent on several factors: (1) wind resource, (2) utility generation mix, (3) assumed WECS penetration, and (4) year of WECS installation. The studies also show that WECS increase system reliability in many cases and thus can displace some capacity. This capacity displacement - measured in terms of effective load-carrying capability (ELCC) - declines with increasing WECS penetration. Sensitivity cases were examined to determine the effects of changes in utility financial parameters, fuel cost projections, WECS operation and maintenance costs, and the generation mix overtime. The results of the normalization indicate that the value of WECS to utilities ranges from $1500 to $4000 per kW, depending on the factors listed above. In reality, however, the amount that utilities could afford to pay will probably be significantly lower due to the uncertainties inherent in the predictions, and the limitations of the value-analysis methodology, which is based on a single-year simulation of a utility system. Thus, the normalized-value estimates reported here are optimistic because they ignore dynamic changes in the generation mix and competition from other alternatives.

1706 Wind Energy Engineering

REFER ALSO TO CITATION(S) 43536, 43635, 43671, 43676, 44465, 44466, 44467

43679 **(BEOP—12, pp 34-51) Normal and exceptional loads for wind turbines with horizontal axis.** Janssen, L.G.J. Jun 1982. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Patten, Netherlands.

In Regulations for wind turbines. Inventory and proposals.

Computation of loads on turbine blades and rotor shaft of wind turbines under normal and exceptional (stormy) circumstances.

43680 **(BMFT-FB-T—82-201) Wind energy converter with high-speed vertical axis rotor and straight rotor blades.** Zelck, G. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 108p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750199.

Portions are illegible in microfiche products.

The complete documents for a wind energy converter with a vertical axis rotor and straight blades (H-rotor) have been developed. The 2-blade rotor with rigid and rectangular airfoils in wooden construction can reach the nominal output of 75 KVA from 11,4 m/sec. wind velocity onwards. The development activities have been supported by wind tunnel and component tests. The safety requirements against fracture failure were successfully proven by using an original rotor blade which was 14 m in length. The final design selected was based upon previous development work. Trade offs also performed showed that the selected design could be more advantageous compaired with other designs. For an example, the use of wood as a material for the rotary and horizontal blade supports proved to have positive and advantageous result.

43681 (CONF-8210136—, pp vp) **Site selection for wind power plants.** Laude, H.; Theunert, S.; Beyer, R.; Franke, W.; Tetzlaff, G. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

In order to acquire quantitative wind data for the coastal area sites for measuring poles were selected. Measuring stations are composed of three components: the instrument beares, the instruments and the data acquisition system. The inquiry cycle for the data recording was two month. Wind-direction and temperature difference were recorded as instantaneous values, wind velocity during two minutes was averaged by means of a low-pass filter. Before starting operations on the station the cup-type anemometer was calibrated as transmitter of wind velocity and the temperature gauges. Experiences with the procedure of measuring and processing of the measured values are submitted.

43682 (CONF-8210136—, pp vp) **Wind situation in the inland of the Federal Republic of Germany with regard to wind power utilization (especially planning of compound systems).** Jurksch, G. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Economy of compound systems of two-to three wind powerc plants in inland areas is investigated. Results of the analysis show that inland compound systems of wind power plants do not promise to be efficient. The results are based on the hourly mean values of the wind velocity and is valid-for the time being - only for the reference altitude of 10 m above ground. Time-synchronous wind velocity differences between the different sites and areas do not permit to compensate for mutual times of standstill.

43683 (CONF-8210136—, pp vp) **Representation of regions suitable for the construction of large wind power plants in the Federal Republic of Germany.** Henke, L. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

For the purpose of utilizing wind energy metereologically suitable areas were defined by means of a list of criteria. Data of Growian I were used as a basis for elaborating the technically usable potential of wind energy. This report briefly describes the study containing special experiences made during this elaboration. Regions which are appropriate for the erection of wind power plants of the MW-range are indicated on maps. The article is further concerned withe the contents of the study.

43684 (CONF-8210136—, pp vp) **Comparative study of the operational behaviour of wind power plants of power class 10 kW.** Fries, S.; Petersen, G.; Mengelkamp, H.T.; Bruegmann, J. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Nine different wind power plants of power class 10 kW which are offered on the German market were put to a continuous test on one test site of two to three years. The test site is located on the German North Sea coast. The plants were tested for reliability and efficiency. The plant producers are expected to evaluate the measurement results and the operational behaviour for improving their products. The tested wind power plants are described. Test results obtained so far make it clear that German producers of small wind power plants need more intensive support to enable them to offer plants more successfully as before.

43685 (CONF-8210136—, pp vp) **Measurements on a 15 kW-wind power plant. Phase 2.** Machens, U. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

A Brummer wind power plant, type BW 150 with a power of 16 bw feeds current into the public network. The plant was built with two generators of different power and speed. Measurements showed that two generators on this site do not bear any advantages. After switching over to one generator only a new gear unit was designed in such a way as to switch on the plant at about 3.5 m/s and keep it connected to the network until 15 m/s. By removing the second generator and changing the network intrusion one has to reckon with slightly different performance data. Expertise was ordered for judging the profitability of the plant. Information was provided on the influence of investment cost on the specific production cost of a wind power plant, and a comparison of cost and profit of a wind power plant as a factor of utilization time was given.

43686 (CONF-8210136—, pp vp) **Contribution of wind energy to the energy balance of a combined solar-wind power station.** Giess, B.; Wensierski, P. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

This contribution deals with measurements carried out in order to study a combined solar-wind power plant. Energy which is gained from sun and wind is channelled into a 6 m^3 water storage unit and used for heating and service water heating of a one-family house. Additionally a night-current heating system was installed in the storage boiler which covers the residual energy demand during the winter. It is intended to show with the plant whether a combination of solar- and wind energy will offer a more uniform energy offer over the year than one of both energy source alone.

43687 (CONF-8210136—, pp vp) **Development and testing of heat generating wind power plants for heating of buildings.** Witt, H. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

This is an interim report on the development of heat generating wind power plants for the heating of buildings which has been going on since the end of 1979. Energy conversion was carried out by means of a fluid friction dynamometer. The essential points are: 1. development of the fluid friction dynamometer 2. Development of a suitable wind-power propulsion unit 3. Setting up a plant for permanent testing 4. Setting up a measurement and control unit. 5. Permanent tests, dealing with the results evaluation, especially with regard to a cost-benefit analysis. Point one to three have been almost finished. Results of the development of the fluid friction dynamometer were very encouraging. It can be safely assumed that small, easy to produce unit can be built with a specific performance which is high enough to make them suitable for direct drive without transmission in connection with high-speed rotors. Points 4 and 5 are still undone.

43688 (CONF-8210136—, pp vp) **Study on the dynamic stress of wind energy converters with vertical axis and on starting- and overload control.** Simhan, K.; Duetting, S.; Helms, L.; Strackerjan, H.J.; Volk, K. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Three different programmes for the calculation of performance and moments of vertical axis rotors are presented. Model rotors in three sizes were constructed, measurements on the rotors were carried out in a water- and a wind tunnel and on a test stand outdoors. First results show that Darrieus rotors are able to start independently and that an overspeed regulation by blowing out air (spoiler effect) is quite realistic. Tests with larger outdoor rotors will finally inform us how far an independent starting can be achieved at a sufficiently high performance coefficient in the operational range.

43689 (CONF-8210136—, pp vp) **Construction and operation of the large wind power plant GROWIAN I.** Witt, H. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

A construction time of three years was assumed for the setting up of the wind power plant Growian and the two measuring poles of 170 m. altitude. This phase is followed by a phase of operation of three years as well. The report provides a survey about the developments until July 1982. Main characteristics, systems data and plant site are described. Even though the main characteristics and the plant's system data did not deviate from the specifications the construction of almost all components had to be revised carefully. The modified rotor-black was the reason for it. The individual components of the plants are described: foundations of tower and rigging, tower, machine house, rotor hub, machinery buildings for accomodating staff and machinery, wind measuring poles, mains input. Rotor blade mainting is planned to be terminated by the end of 1982. Cost for the plant will exceed the 1979 calculation by about 35%.

43690 (CONF-8210136—, pp vp) **GROWIAN - rotor blades.** Thiele, H.M. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

The first phase of design construction and calculation of rotor blades for Growian was concluded in July 1981 with the construction of a test rotor blade and static tests. Based on this experience the first two rotor blades for the Growian plant were built in a second phase until July 1982. For aerodynamic design one used Wortmann-profiles of the FX 77 W series. Blade dimensioning was oriented on five basic laod cases. The construction concept adopted was a load-bearing steel box-spar with a plastic shell which creates aerodynamic loads. E-glas cloth and hard foam were used for the spar box and the shells. The production engineering processes are described.

43691 (CONF-8210136—, pp vp) **Examination of the documents prepared for the construction of the rotor blades GROWIAN I.** Lehmhus, R. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Several tasks had to be carried out during the authorisation procedure for the construction of the wind power plant GROWIAN-tests for solidity, stability and dynamic behaviour, check of all essential construction - and production systems including materials testing, solidity control, checking and judging all safety measures set up for control of operations. In building Growian I one could not rely on operational experience with similar plants. There were however results from research institutes available for the loads of the rotor blades. Judgment of safety measures was based on calculation documents, drafts and working drawings, experimental solidity- and vibration tests, standards, material testing and the building laws of the land of Schleswig-Holstein.

43692 (CONF-8210136—, pp vp) **GROWIAN - planning of the measurement- and test programme.** Koerber, F. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

The first large wind power plant of the Federal Republic of Germany will start operations in autumn 1982. It is situated on the Kaiser-Wilhelm polder district Dithmarschen on the North Sea coast. A trial run of 6 weeks will be followed by a three-years test phase with energy supply into the compound network. During this time however Growian will not only serve the purposes of energy supply but emphasis will be put on testing the machine and on collecting operational experience with a wind power station. The measurement and test programme GROWIAN was planned for the starting of operations and the trial run and the three-year-phase of test operation. It is introduced in this report. The task of the programme is to document the phase of test operation which will enlarge our knowledge about large wind power plants in general and the design, construction, operation and economic use of GROWIAN in particular. In order to ensure the success faces of the measurement programme it is necessary that the experts responsible for the machine house, energy supply, meteorology and environmental protection cooperate very closely. They have the possibility to rely on comprehensive calculations, simulations, results of experiments and construction experiences made during the preparation work. This justifies the hope for utilization of wind power as an additional primary energy.

43693 (CONF-8210136—, pp vp) **Wind power converter WEC 520 'long-term 41050'.** Spittler, W. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Owing to the favourable operational behaviour and the performance of the wind power converter WEC 520 a long-term testing was started. After the occurrence of a rotor blade damage the plant was re-checked. A two-blade rotor with a semi-cardanic pendulum bearing and rotor blade regulation was built for WEC 250. The construction elements of the plant are presented: a servobrake for the elimination of the yawing, the generator safety coupling and the safety equipment for lowering the plant. The report also deals with the speed control circuits, mains connection, the optimum performance range and the optimising of the speed of the rotor.

43694 (CONF-8210136—, pp vp) **Description of the 400 kW single-blade wind power plant 'Monopteros'.** Meggle, R. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Within the project 'Wind power plant GROWIAN II' a test system was developed, namely the single-blade pilot plant 'Monopteros'. The final assembly of the plant took place at the end of 1981 in Bremerhaven-Weddewarden. The main characteristics are: single-blade rotor with free-flapping, swivel-rigid design a supercirital tower concept, and an inverse speed real output control. The advantages of a single-blade-rotor principle are explained. Further characteristics of the plant are introduced as well as the individual components of the plant: rotor blade, rotor head, gondola, tower, transmission substation and the concept for controlling speed and power. Finally, the paper deals with the operations control system which is able to control the plant fully- or semi-automatically, and with the independent measurement and data system of the pilot plant.

43695 (CONF-8210136—, pp vp) **OPTIWA - optimisation of large wind power plants.** Argyris, J.H.; Braun, K.A.; Kirchgaessner, B.; Kuemmerle, W.; Mueller, M. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

A two-phase project for optimising wind power plants is introduced. In the first phase, new methods of calculation were developed and a computer-controlled rotor hub including data acquisition system was constructed, which serves for optimising large horizontal wind power plants. Phase two serves for extension and verification and for optimising several rotor conepts. The computer controlled rotor hub is integrated into an outdoor plant with a rotor diameter of 16 m and used for verification of the computer programmes and optimisation of rotor concepts. The results of both partial aims of phase 1 that is the development of new computing methods and the construction and laboratory test operation of a computer-controlled model of the functions.

43696 (CONF-8210136—, pp vp) **Operational behaviour of wind power plants. Pt. 1.** Drews, P.; Kleinkauf, W.; Thuer, J.; Wettlaufer, R. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

With the example of the wind power converter AEROMAN it could be proved that the designed control- and operational control structures are suitable to control an aerodynamically well designed plant in such a way as to allow its integration into the mains or isolated operation and to fulfill the requirement in an absolutely satisfactory way. Further measurements (determination of the wind speed which is decisive for the converter; the pertaining starting performance and other plant parameters) permitted to judge, procedures for digital simulation of the plant behaviour for their reliability and usefulness for the examination of plant concepts. If the model is set up carefully one achieves a good accordance of calculation and measurement. Plans are to investigate how close the theoretical models for plant control are to practice. Laboratory tests and field measurements will be the main points of further studies.

43697 (CONF-8210136—, pp vp) **Operational behaviour of wind power plants. Pt. 2.** Albrecht, P.; Vollstedt, W. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Within the research project ET 4362 A control procedures for several electromechanic energy converters are examined, special importance is attributed to speed-variable plants. A slip ring asynchronous engine as wind power generator would be a compromise between the demand for sturdiness of the electric system and a speed range as large as possible. Results of studies of two options for operating of this type of generator, in both cases the operational behaviour is influenced by the rotor current. In the case of the technically more simple method (over synchronous static Kraemer system) the rotor performance is controlled via a d.c.-intermediate circuit and then fed into the mains; while in the other, more complicated solution (doubly-fed asynchronous generator) a rotor rotary field is impressed with a direct a.c. converter; the machine in this case can not only work with variable speed but also with controllable reactive power.

43698 (CONF-8210136—, pp vp) **Setting up a gust generator for the development of wind turbines.** Wortmann, F.X.; Walter, G.A. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

In the Institute for aerodynamics and gas dynamics of Stuttgart University a gust generator is under construction which consists of a gust tunnel and a gust grid. The tasks are: generation of reproduceable temporary and spatial gusts with vanable frequencies, amplitude and spectral distribution, this allows to observe the dynamic behaviour of wind turbine models in adequate size, and to carry out a direct comparison of measured values and results of numerical handling of gust problems. It also gives us an important instrument for checking existing computer programs, theories and assumptions and allows us while bearing in mind all degrees of freedom - to carry out function control of and to arrive at direct statements on several control concepts of the model rotor. The gust tunnel is designed as an open Eiffel-type, the dimensions were specified by important model law requirements. Gusts are generated by a gust grid which is located at one end of the measuring chamber and equipped with adjustable blades which can be arranged and controlled according to the type of gust. An outer cylindrical ring space on the measurement chamber permits the circulating around obstacles with a great stream line extension.

43699 (CONF-8210136—, pp vp) **Blade technology programme for large wind power stations.** Muser, D. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

The overall objective of the project is the development of blades optimised in terms of technology and cost for large wind

power stations. This programme is complementary to the current and planned work done in large plants. Economy of these plants is hoped to be increased by this. Apart from theoretical performance optimisation which included aspects of production engineering several blade concepts were examined and promising species went in for test production. This was done in four main sections: - optimisation - list and choice of concepts - concept design - test programme.

43700 (CONF-8210136—, pp vp) **Concentration of wind power in turbulent fields and their utilization for the production of energy.** Greff, E.; Holzdeppe, D.; Oery, H.; Schwarte, H.; Staufenbiel, R. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Studies on wind power concentration in turbulence fields which have been carried out so far, were mainly concerned with experimental and theoretical investigation of systems with delta-Shaped surfaces as turbulence generators. Based on interim results of the studies is seemed reasonable to proceed to a phase of outdoor experiments. Towards the end of the study phase I (project denomination 3-ET-4252A) exact investigation of a turbulence field were made by means of a special measuring probe, these led to a critical review of results obtained before. The studies were continued within the assignment 3-ET-4252B. Parallel to the studies of the Aachen Institutes the Krupp GST company carried out a general system study on basic solutions of wind concentration.

43701 (CONF-8210136—, pp vp) **Atmospheric-thermic solar chimneys.** Mayr, G.; Haaf, W.; Schlaich, J. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Solar chimneys utilize solar radiation to generate electric energy. Three well-known methods were combined in a new way: Greenhouse, chimney and wind-wheel with generator. On behalf on the German Ministry for Research and technology in cooperation with the project management for energy research of the nuclear research centre Juelich, a first prototype with a chimney of 200 m altitutde and a collector roof with a diamter of 250 m was built in Spain. Current first measurement are quite encouraging and promise to confirm the calculated performance.

43702 (CONF-8210136—, pp vp) **Construction of two wind power plants AEROMAN 11/11 for Indonesia.** Thiele, H.M. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

The project 03E 4431 A was carried out within the frame of the German-Indonesian agreement on cooperation on the field of scientific research and technological development. The objective of the project was to facilitate the starting of the construction of modern wind power plants for the Indonesian cooperation partner, the LAPAN institute. The energy produced by wind power plants is to be utilized on the sites. As the wind situation in Indonesia seemed adequate it was decided to built two wind power stations of the AEROMAN 11/11 type in the isolated operation version. One of the plants is destined for the operation of ice-breaking machines the production of which is used by a fisherman's village in the vicinity Plant II serve for decentralised drinking water supply or irrigation.

43703 (CONF-8210136—, pp vp) **Development, construction and operation of a 30/100 kW wind power plant built in German-Brasilian cooperation.** Molly, J.P. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

A wind power plant of 25 m diameter and 100 kW output was developed and tested as a German-Brazilian joint venture, its design permits to operate it optimally at different wind velocities. The design draft takes the boundary conditions of transport, construction and network quality into account which means that construction and operation can be carried out quite easily even in remote, less-developed areas.

43704 (CONF-8210136—, pp vp) **Construction and testing of a wind park on the Cyclade island of Kythnos.** Koeppel, W. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Vast areas in Greece offer favourable preconditions for an intensive utilization of wind power. A project of cooperation, is described, the purpose is to supply current-generated by wind power - to small local island networks. For the first time the idea of a wind park was put into practice with this project. An electronic system for operational management was developed for parallel operation of several wind power plants, it permits an interlinkage of the individual plants and a trouble-free connection to the existing network of the cyclade island of Kythnos. Based on the perfomance - and energy data of a 1,5-year field test a profitability analysis will be carried out. The wind park comprises 5 wind power stations, Type Aeroman 11/20, which belong to the performance class 10-20 kW. Description of the technical concept, operational management of the wind park, network connection, plant construction and status quo.

43705 (CONF-8210136—, pp vp) **Development and testing of a 20 kW vertical rotor (Phase 1).** Fritzsche, A. 1982. (In German). NTIS (US Sales Only), PC A23/MF A01.

From Seminar and status report on wind energy; Juelich, F.R. Germany (11 Oct 1982).

Concept, construction and testing of a 20 kW-wind power converter with a rotor of the Darrieus - type are explained. The plant situated in the South of Argentina in the province of Patagonia. Operations started in 1981. The total efficiency degree was calculated to be 35% based on measurement results of wind power data. The report supplies data on the plant is dimensions, method of operation and the quality of the energy produced. This prototype plant is meant to supply information necessary for senal production and for an economic application beneficial for the consumers.

43706 (DOE/NASA/9235—75/2) **100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results.** Anderson, W.D. (Lockheed-California Co., Burbank (USA)). Jun 1975. 103p. (NASA-CR—134957). NTIS MF A01. Order Number DE83014895.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

This report presents the results of dynamic analyses, weight and balance tests, static stiffness tests, and structural vibration tests on the 60-foot-long metal blades for the ERDA-NASA 100-kW wind turbine. The analytical results show the metal blades to be free from structural or dynamic resonance at the wind turbine design speed and show that aeroelastic instabilities are unlikely to occur within the normal operating range of the wind turbine.

43707 (EPRI-AP—2884-SR, pp 4.1-4.7) **Wind power: a promising future generating option.** Goodman, F.R. Jr. (Electric Power Research Inst., Palo Alto, CA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Electric utility industry activities in wind power have increased significantly in recent years due to encouraging results which have emanated from various federal and privately funded technology development programs. This paper discusses the technological status and prospects of wind turbines for electric utility applications. A summary of utility activities is given and major projects are described in more detail. The wind power program of the Electric Power Research Institute is also discussed.

43708 (EPRI-AP—2884-SR, pp 4.9-4.19) **DOE/NASA large horizontal axis wind turbine research and development.** Thomas, R.L. (National Aeronautics and Space Administration, Cleveland, OH). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The large wind turbine program is a major segment of the Federal Wind Energy Program sponsored by the Department of

Energy (DOE). The NASA Lewis Research Center manages the large wind turbine program for DOE. The large wind turbine program is directed toward development of the technology for safe, reliable, environmentally acceptable large wind turbines that have the potential to generate a significant amount of electricity at costs competitive with conventional electric generation systems. In addition, these large wind turbines must be fully compatible with electric utility operations and interface requirements. This paper provides an overview of the large wind turbines activities managed by NASA Lewis. These activities include results from the first and second generation field machines (Mod-0A, -1, and -2) the status of the Department of Interior WTS-4 machine for which NASA is responsible for technical management, and the design phase of the third generation wind turbines (Mod-5).

43709 (EPRI-AP—2884-SR, pp 4.21-4.31) **Vertical axis wind turbine research and development.** Braasch, R.H.; Kadlec, E.G. (Sandia National Labs., Albuquerque, NM). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—). Contract AC04-76DP00789.

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The vertical axis wind turbine research and development program is reviewed. Major activities in aerodynamics, structural dynamics, and system development research and development are reviewed and expected future directions are emphasized. Resolved and unresolved issues are listed in structural, aerodynamic, and system program areas. (LEW)

43710 (EPRI-AP—2884-SR, pp 4.33-4.41) **Domestic and foreign wind turbine research.** Vachon, W.A.; Frantzis, L.; Schiff, D. (Arthur D. Little, Inc., Cambridge, MA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Ongoing wind turbine development and test activities in the United States, Canada, and Europe are briefly summarized, including megawatt-scale machines and turbine clusters. (LEW)

43711 (EPRI-AP—2884-SR, pp 4.43-4.51) **Wind power activities of Pacific Gas and Electric Company.** Hillesland, T. Jr.; Steeley, W.J.; Kruckewitt, T.W. (Pacific Gas and Electric Co., San Ramon, CA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

One of Pacific Gas and Electric Company's key corporate goals is to develop electric resource plans to maximize use of cogeneration, hydro, wind and other resources that can be developed with minimum regulatory risks, short lead times and minimal Company capital requirements. As a result, PG and E has been actively pursuing wind energy development. In order to identify and characterize the wind resource throughout the Company's service area, several meteorolgical monitoring programs are continuing while others are planned. Early results were used to site a Boeing Wind Turbine Model 2560 (BWT 2560) in Solano County, California. Construction was completed in March 1982 and first rotation occurred in April 1982. The wind turbine (WT) system is currently in the final stages of checkout and testing by Boeing Engineering Corporation before formal acceptance by PG and E. Commercial operation is expected this summer. Results from the BWT 2560 checkout and testing are reported. Plans for an extensive two-year WT monitoring program include emphasis on wind and machine availability, WT performance (capacity factor) and environmental impacts. PG and E also plans to purchase power of up to 400 MW of wind generation from privately-financed wind farm developers. In the Altamont region of Alameda County in California, megawatt clusters of small wind turbines have already delivered electricity into PG and E's transmission system.

43712 (EPRI-AP—2884-SR, pp 4.53-4.62) **Wind power activities of the Bureau of Reclamation.** Watts, A.W. (Bureau of Reclamation, Denver, CO). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

The Bureau of Reclamation (Reclamation) initiated a study in October 1978 to investigate the concept of integrating 100 MW of wind energy from megawatt-size turbines with the Federal hydroelectric system. As part of the study, one large wind turbine was purchased through the competitive bid process and is now being installed to serve as a system verification unit (SVU). Reclamation negotiated an agreement with NASA to provide technical management of the project for the design, fabrication, installation, testing, and initial operation. Hamilton Standard was awarded a contract to furnish and install its WTS-4 wind turbine rated at 4 MW at a site near Medicine Bow, Wyoming. A second SVU was purchased through a NASA contract with Boeing for a 2.5-MW machine called the MOD-2. The two machines are of different designs, and operations at the same site will provide comparative operating data to evaluate their performance. The purpose for installing the SVU's are to fully evaluate the wind/hydro integration concept, make technical evaluation of the hardware design, train personnel in the technology, evaluate operation and maintenance aspects, and evaluate associated environmental impacts. Data from the two SVU's will be used to prepare a final design for a 100-MW wind farm if Congress authorizes the project. The feasibility report for the Wind-Hydroelectric Energy Project, Wyoming, dated June 1981, has been completed. The report concludes that a 100-MW wind field at Medicine Bow has economic and financial feasibility. The Federal Government, through Reclamation's construction of the Medicine Bow wind field, could demonstrate to the industry the feasibility of wind energy. Both SVU units are expected to be operational in August 1982. After acceptance of the units, a 2-year operational test plan will be conducted to evaluate power quality, machine availability, maintenance, noise, electromagnetic interference, wake effects, and dispatch management.

43713 (EPRI-AP—2884-SR, pp 4.63-4.69) **Wind power operations and maintenance.** Lynette, R. (R. Lynette and Assoc., Redmond, WA). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—).

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

If wind turbines are to be commercially successful in utility applications, they must be reliable and easily maintained. It is too early in the deployment cycle to predict precise long term wind turbine reliability and operations and maintenance costs; nevertheless, early experience has provided enough data to put some bounds on these parameters. This paper: (1) defines wind turbine availability and operations and maintenance activities and shows how they impact the cost of energy; (2) summarizes the theoretically achievable values and the experience on early machines; (3) provides estimates of anticipated mature wind turbine availability and operations and maintenance costs for both megawatt and submegawatt machines; and (4) identifies critical operational and logistics considerations.

43714 **(Memorandum-M—422) Weight and cost analysis of large wind turbine rotors constructed from conventional materials and from advanced composite materials.** van Holten, Th. (Technische Hogeschool Delft, Afdeling der Luchtvaart- en Ruimtevaarttechniek, Delft, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jul 1982. 18p. (In Dutch). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770216.

Portions are illegible in microfiche products.

Cost calculations and cost analyses of the blades and the (teetering) hubs of large wind turbines. The blades are of different shapes, construction and materials (aluminium, steel and glass reinforced plastics). Teetering hubs are heavy and complicated steel constructions, necessary to minimize material fatigue. In large wind turbines with a diameter of 60 to 100 m or even more the rotor mass (hubs and blades together) may vary from 46,000 to 216,000 kg. Costs are estimated to be DFL. 16/kg, both for teetering hubs and/or blades made of glass reinforced plastics. Due to lack of experience and of exact knowledge of the loads appearing during operation under field conditions the uncertainty factor may be 10% to 15%.

43715 **(Memorandum-M—427) Measurement of the Cp-lambda curve of wind turbines under field conditions.** van Holten, Th.; Kooman, J.L. (Technische Hogeschool Delft, Afdeling der Luchtvaart- en Ruimtevaarttechniek, Delft, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Sep 1982. 17p. (In Dutch). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770215.

Portions are illegible in microfiche products.

Turbulence of wind under field conditions causes inaccurate and irreproducable measurements of power coefficients of wind turbines. Consequently it is difficult to draw smooth curves through the obtained measuring points. Solution is found to process these data piece-wise. This method is described and used in a computer program, named PIECE-WISE, compatible with a HP9826A.

43716 **(NE-VIND—82-45) Aeroelastic stability and dynamic response analysis of the LDB-125 vertical axis wind turbine.** Vollan, A. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). 1982. 57p. (FFA-TN—1982-19). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750782.

Portions are illegible in microfiche products.

An investigation of the stability and the dynamic response behavior of the proposed vertical axis wind turbine LDB-125 has been performed. Because the LDB-rotor imposes many new and unconventional features, like double L-blades, inclined tower, rotating base, extensive use of guy wired etc, it was decided to perform a thorough dynamic response and stability analysis using a rather complex model of calculation in order to minimize the risk of neglecting significant physical effects. It has been shown, that the LDB-125 rotor has no instabilities or dangerous resonance regions in the normal operating range of rotational velocity. Compared to conventional Darrieus rotors, the LDB concept seems to be very favorable from a structural dynamic point of view. Care must be taken to maintain sufficiently high stiffness in the radial beams of the rotating concrete base structure as well as in the roller bearing system. In this early phase of the project, of course some assumptions concerning the construction details had to be made because drawings are not yet available. It is therefore extremely important to follow up with calculations during the construction phase and continuously verify - and if necessary, correct the design.

43717 **(NP—3750779) Classification of the wind of two areas in the district of Halland.** Fredriksson, U.; Kvick, T.; Lindgren, C. (Sveriges Meteorologiska och Hydrologiska Inst., Norrkoeping). Oct 1981. 16p. (In Swedish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750779.

Portions are illegible in microfiche products.

Two areas of the district of Halland have been chosen to verify the potential of wind energy production at the height of 50 and 100 m. Their total area is 1330 km². The areas have been classified according to the smoothness of the landscape. The categories are four, namely water surface, open landscape, relatively open landscape and finally forest, settlements and spatially small landscapes. The roughness of the landscape stands in the way of the wind and it takes a certain distance for the wind to restore its original velocity after having passed a different category. The various categories are presented on maps on scale 1:100000.

43718 **(ORNL/SUB—82/69604/1) Investigate alternative interconnection strategies for arrays of wind-turbine generators. Final report.** Zaininger, H.W.; Bell, D.J. (Zaininger Engineering Co., San Jose, CA (USA)). Jul 1983. Contract W-7405-ENG-26. 111p. NTIS, PC A06/MF A01. Order Number DE83015746.

One of the principal methods of interconnecting future wind-turbine units to utility systems is expected to be in large megawatt (MW)-scale arrays, connected to the utility transmission, subtransmission, or distribution (T and D) network at a common point, and operated together as any other MW-scale utility-generation plant. There are many potential alternative wind-turbine (WT) array/utility-system interconnection strategies. The purpose of this project was first to develop an appropriate methodology for assessing the relative cost, value, and reliability of alternative WT-array interconnection plans; and second, to perform an initial assessment of a matrix of cases to demonstrate the T and D assessment methodology, as well as gain insights as to potential cost, value, and reliability for array-interconnection plans for a range of wind-turbine sizes and types from a T and D perspective.

43719 **(PNL-SA—9566) Making use of wind energy: a course in evaluating and choosing sites for small wind machines.** Zengerle, R. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 117p. NTIS, PC A06/MF A01. Order Number DE83014945.

Portions are illegible in microfiche products.

A course has been developed to present an integrated, not overly technical approach to siting a wind machine. In the context of this course, the term siting is used in a broad sense to include estimating the wind resource at a site, selecting the best wind machine site, estimating energy production of a wind machine, and estimating the economic value of a wind machine. The workbook treats various topics at significantly greater detail, illustrating various problem-solving techniques with sample problems. In addition, a number of practice problems are given. Complete answers are provided for each problem.

43720 **(RISO-M—2364) Test of Tripod datalogger.** Rasmussen, P. (Risoe National Lab., Roskilde (Denmark)). Nov 1982. 21p. (In Danish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750761.

The report describes parallel measurements of a windmill carried out by the datalogger systems from Tripod Consult ApS and the Test Station. By comparing the points of the two measurements the difference are explained by the inaccuracy of the systems.

43721 **(SAND—82-2115) Modal identification of a rotating-blade system.** Carne, T.G.; Martinez, D.R.; Ibrahim, S.R. (Sandia National Labs., Albuquerque, NM (USA)). Apr 1983. Contract AC04-76DP00789. 20p. NTIS, PC A02/MF A01. Order Number DE83015631.

A new testing technique and the Ibrahim time-domain (ITD) modal identification algorithm have been combined, resulting in a capability to estimate modal parameters for rotating-blade systems. This capability has been evaluated on the Sandia two-meter, vertical-axis wind turbine. Variation in modal frequencies as a function of rotation speed has been experimentally determined from 0 rpm (parked) to 800 rpm. Excitation of the rotating turbine was provided by a scheme which suddenly released a pretensioned cable, thus plucking the turbine as it rotated. The structural response was obtained by passing the signals through slip rings. Using the measured free-decay responses as input data for the ITD algorithm, the modes of the rotating turbine were determined at seven rotation speeds. The measured modal parameters were compared with analytical results obtained from a finite element analysis and with experimental results obtained from a complex exponential identification algorithm.

43722 **Modification of power system operation for significant wind generation penetration.** Schlueter, R.A.; Dorsey, J.; Lotfalian, M.; Park, G.L.; Shayanfar, H. (Mich. State Univ., E. Lansing, MI). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Power Apparatus and Systems;* **102**: No. 1, 153-161(Jan 1983). Contract AC02-79ET23168;AC02-77ET20251.

The purpose of this paper is to discuss modification of unit commitment, economic dispatch, regulation and frequency regulation controls when the level of wind generation capacity is significant. A wind farm penetration constraint is determined, that limits worst case wind generation change from an array due to a thunderstorm to be less than the worst first contingency loss of conventional generation resource or commitment. The farm penetration constraint only acts as an indicator that additional spinning reserve, load following, and unloadable generation capability is required through adjustment of unit commitment and AGC controls if the farm penetration constraint was violated. A discussion of the methodology, costs, and benefits of changing unit commitment when WECS generation is significant (and either satisfies or violates this

farm penetration constraint) is then discussed. A further discussion of the modification of regulation and economic dispatch controls to exploit the changes in response rate capability provided by the unit commitment is also discussed. A modified echelon penetration constraint that limits instantaneous rate of change and change from a wind array that must be handled by governor frequency regulation and regulation controls. This constraint is imposed to limit cycling of units which can incur additional operating and maintainance costs on conventional steam units and possibly safety concerns on nuclear units.

43723 **An assessment of load frequency control impacts caused by small wind turbines.** Curtice, D.H.; Reddoch, T.W. (Systems Control, Inc., 1801 Page Mill Road, Palo Alto, CA 94304). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Power Apparatus and Systems;* **102**: No. 1, 162-170(Jan 1983). Contract W-7405-ENG-26.

A method is presented to analyze the effects small wind turbines' (WTs) output may have on the load frequency control process. A simulation model of a utility's automatic generation control (AGC) process is used with recorded real-time system load data modified by synthesized data characterizing the aggregate output of small WTs. A series of WT output scenarios are defined for various WT penetrations of the total system load. WT output scenarios, varying in frequency and magnitude, are combined with system load variations to test the effectiveness of present AGC control strategies. System performance change from the base case is assessed using area control error (ACE) values, time between zero crossings, inadvertent accumulation, and control pulses sent to regulating units.

43724 **Wind energy systems. Vol. 1.** Bedford, England; BHRA Fluid Engineering (1982). 473p. (CONF-820922—Vol.1).

From 4. international symposium on wind energy systems; Stockholm, Sweden (21 Sep 1982).

Individual papers were separately abstracted

20 ELECTRIC POWER ENGINEERING

REFER ALSO TO CITATION(S) 44650

2001 Power Plants And Power Generation

REFER ALSO TO CITATION(S) 43176, 43257, 43506, 43828, 44057, 44110, 44431, 44740

43725 **(CONF-830446—5) Low-cost peaking capability built into base-load coal-fired power plants.** Miliaras, E.S.; Kelleher, P.J.; Hub, K.A. (Energotechnology Corp., Cambridge, MA (USA); Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 13p. NTIS MF A01. Order Number DE83014746.

From American Power conference; Chicago, IL, USA (18 Apr 1983).

Microfiche only, copy does not permit paper copy reproduction.

This paper presents the results of a DOE-funded study conducted with the cooperation of equipment manufacturers, that evaluated the feasibility and economics of built-in peaking capability for base-load, coal-fired power plants. The proposed baseload/peaking plant is an extension and refinement of the once-common utility practice of shutting off steam supply to the high-pressure feedwater heaters combined with the earlier practice of bypassing high-pressure turbine stages; these measures result in increased steam flow through the downstream turbine stages, substantially increasing turbogenerator output. The peaking capacity is generated at lower efficiency, as the thermodynamic cycle efficiency is progressively reduced with increasing output. Conceptual design, cost, and performance estimation was carried out for such a 500/700 MW coal-fired base-load/peaking (b/p) plant. The cost of generation from the peaking increment of this plant was compared to the costs of generation from several alternate peaking generation technologies.

43726 (CONF-8208141—, pp 42-65) **Quality coal for electric utility use.** Blackmore, G. (American Electric Power Service Corp., Lancaster, OH). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

A short 12 years ago, utilities could purchase just about any steam coal for $5 per ton to burn in generating stations built for $100 of capital investment per kilowatt of installed capacity. Today, depending primarily upon sulfur content, coal will sell from $20 to over $40 per ton and new generating stations cost in excess of $1000 per kilowatt. We are told that some new stations coming on line later in this decade will cost well in excess of $2000 per kilowatt of installed capacity. With these new economics, it is essential that the utilities squeeze every ounce out of their existing, lower-cost assets. And, with coal prices at a much higher plateau, the incremental costs of securing a higher-quality, more consistent coal are not overly significant. The successful marketer of coal in the future will be the guy who thoroughly understands the economics of coal burning from the utilities' perspective, the guy who can totally integrate his thinking to include the economics of coal production, preparation, transportation, combustion and ash handling. He must also understand environmental control. In short, he needs to understand what we call the total Coal Energy System. That System extends from the coal seam itself, with its complex chemical and mineral make-up, to the burning of the coal in the boiler and disposal of the ash residue, to the final cost at the power station busbar for the electricity generated.

43727 (CONF-8208141—, pp 81-110) **Irvington Generating Station coal conversion project.** Cochran, R.A. (Charles T. Main, Inc., Boston, MA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

In summary, TEP's conversion of Irvington Generating Station has received from DOE the final prohibition order and is, therefore, proceeding towards operation of Unit 4 on coal in May of 1985, with Unit 3 to follow in 1986, and units 1 and 2 in 1987. Although this is the first straight conversion in a utility application in North America, the State Energy Commission of Western Australia at their Kwinana Power Station has successfully completed conversion of a unit very similar in original design, size and coal burned. Therefore, we do not expect any major unforeseen surprises at Irvington. To propose that direct coal conversion is justifiable or physically feasible at any other gas and/or oil-fired unit, based on the conditions at Irvington is virtually impossible. Although comparison of present and projected oil and/or gas costs to coal demands that conversion or re-conversion be evaluated in almost every utility application, any one or a combination of economics, load requirements, physical limitations and environmental requirements could easily eliminate realistic conversion opportunities. Each unit (or station) will have to be evaluated at length on its own merits before serious consideration to convert can be given.

43728 (CONF-8208141—, pp 111-127) **Conversion to coal in Du Pont.** Robnett, J.D. (Du Pont and Co., Camden, SC). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

Coal accounts for a much larger share of the fossil fuel burned in Du Pont plants to produce steam now than at the time of the oil embargo in 1973. Most of our increased use of coal has been made possible by rehabilitating the support systems of existing boilers inherently capable of burning coal and installing pollution control equipment enabling them to meet new emission regulations. The remaining increase results from the construction of new coal-fired powerhouses in five plants. Although we are evaluating coal gasification, fluidized bed combustion, burning of coal-water mixtures, etc., none of our increased use of coal thus far employ these methods. Our progress has resulted from the nitty gritty application of pulverized coal and spreader stokers equipped with electrostatic precipitators, baghouses, or two-stage mechanical dust collectors. The newest plants employ staged combustion of pulverized coal for

control of NO/sub x/ and microprocessor-based combustion controls and burner management systems to maximize boiler efficiency and hold the number of operating personnel to a minimum. I will describe a few of the retrofit projects, as these may help others in their coal conversion plants, then describe features of our new powerhouses, and conclude with a brief report on our studies for the future application of coal.

43729 (CONF-8208141—, pp 156-168) **New England Electric coal conversion experience.** Kaslow, J.F. (New England Power Co., Westborough, MA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

The key to assessing the economics of retrofitting is the definition of the scope and cost of the project and estimating the additional operating costs versus the potential or expected fuel cost savings. Definition of the scope of the project is heavily influenced by the original design of the units, the choice of coal specifications and - most important - the environmental requirements. To a significant degree, the three factors are interrelated. We recognized from the start that until the environmental issues were resolved no meaningfull progress could be made so that became our initial focus. Despite a cooperative attitude on the part of our state and federal regional environmental agencies, the resolution of the environmental issues on the Brayton Point project covered the span of more than two years of concerted and intensive effort. From initial discussions to final State Implementation Plan approval covered a period of roughly four years. Since our oil burning regulations in Massachusetts were predicated on a most homogeneous fuel whose sulfur content could be finely controlled, it is not surprising that treatment of sulfur variability in coal and averaging periods involved some fundamental changes in concept. In addition, how to treat coal sulfur variability in air quality modeling - particularly for the short term ambient standards - posed some regulatory problems. From my company's standpoint, one additional element in our environmental negotiations was a compelling issue - that we not face changes in the State Implementation Plan once we had committed major expenditures for the conversions. On this point, the state agreed to a best efforts agreement not to tighten the Implementation Plan limits for a period of ten years.

43730 (CONF-8208141—, pp 286-293) **Retrofit of a package boiler to utilize producer gas.** Campbell, H.L. (Dravo Engineers, Inc., Pittsburgh, PA). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

A coal gasification facility (Wellman-Galusha) has been constructed in an industrial park in northeastern Pennsylvania. The facility is designed to produce low Btu gas from local anthracite coal and offer prospective industries an attractive alternate fuel source. An industry currently located in the industrial park has converted a package boiler designed for No. 2 fuel oil to low Btu gas (LBG). This paper describes the gasification facility, explains the purposes of the facility, and examines the initial results of converting a package boiler, designed for fuel oil, to firing with LBG. The sulfur and nitrogen oxide discharges from the boiler when operating on producer gas are discussed.

43731 (NP—3770135) **Investigations on operational behaviour of hybrid cooling towers.** Haeuser, U. (Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik). 10 Jul 1981. 106p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770135.

Thesis.

The operating characteristics of various types of hybrid cooling towers have been compared. For this purpose, a given wet cooling tower has been combined with a given dry cooling tower by varying the air and water circuit without changing the operating conditions. Criteria of assessment were the cold water temperature, the rate of evaporation, and the evolution of a visible plume. The wet cooling tower is described by an evaporation coefficient and the dry cooling tower by equations for a heat exchanger.

43732 (NP—3770188) **Investigations of glands for valves and slides for gases.** Behrend, E.; Ludwig, J. (Bundesanstalt fuer Materialpruefung, Berlin (Germany, F.R.)). Dec 1979. 21p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770188.

Portions are illegible in microfiche products.

The investigations were conducted under laboratory and operational service conditions. Investigations on the determination of leak rates were carried out with twelve valves previously having been still unused and five valves previously having been in operational service for half a year by applying an immersion as well as a wrapping procedure. Investigations were made with nine valves under operational service conditions by use of the wrapping procedure. The emission behaviour of 1639 valves which had been installed in technical plants was estimated by application of a spray procedure to ascertain the results of the investigations on the determination of leak rates which were carried out by conducting the two other procedures.

43733 (NP—3770193) **Contribution to the dynamic behaviour of steam power plants.** Mikhael, N.N. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 7 Nov 1980. 225p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83770193.

Portions are illegible in microfiche products; Thesis.

The concept for the investigation of the stationary operational behaviour calculates the characteristics of the whole plant from the characteristics of its components. In the first step a computer program is developed that computes the stationary behaviour of a power plant from the measured values of the plant components (partial load). The results are compared with the measurements. The dynamic behaviour of the whole plant is computed from its components. In the second part the components are split into groups so that they can be described as simply as possible with mathematical models. The necessary equations are written out, linearized and solved by means of the Laplace transformation. One obtains as a result the transfer functions of the partial systems as well as the load-dependent, time-independent coefficients (model parameters). The components are grouped together in the third step, so that one can calculate the dynamic behaviour of the whole plant. One obtains knowledge on the time behaviour of the plant during load changes by means of the dynamic plant model and landmarks for a suitable control concept. The linearized model describes only small changes of state with sufficient accuracy. Finally a method is presented, by which the calculation of the dynamic behaviour can be extended towards large changes of state.

43734 **Industrial power: electrical rates, reliability, and energy management.** New York, NY; McGraw-Hill Publications Company (1980). 344p. (CONF-8010335—PAPB).

From Industrial power - electrical rates, reliability, and energy management conference; New York, NY, USA (7 Oct 1980).

Twenty-five papers are enclosed that cover various aspects of the following: (1) fuel cells, (2) cogeneration, (3) equitable pricing, and (4) fuel costs and savings. (MOW)

2002 Environmental Aspects

REFER ALSO TO CITATION(S) 43178, 43205, 43212, 43213, 43214, 43216, 44751

43735 (BMFT-FB-T—83-073) **Flue gas desulphurization in a spray tower with de-coupled recycling of soda ash.** Liebgott, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). May 1983. 74p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83751043.

Portions are illegible in microfiche products.

RD project to develop a "dry" process for the desulphurization of flue gases. The process is based on a desulphurization step with a solution of soda ash which is sprayed into the flue gas. The gas is cooled by evaporation but its temperature is still higher than the dew point; reheating is not necessary. The product of the desul-

phurization is a dry mixture of sodium sulphite and -carbonate. It is intended to reprocess this powder to soda in a central plant - serving several power stations. First sulphite is oxidized to sulphate, which in turn is reacted with calcium chloride to form calcium sulphate and sodium chloride. The latter is introduced into the Solvay-soda ash process which yields calcium chloride as a by-product. Tests were carried out for the desulphurization step and the oxidation of sulphite. The desulphurization tests resulted in poor degrees of SO_2-removal even with high stoichiometric ratios of soda ash to sulphur dioxide. The preliminary estimates of process economics made before start of experimental work could not be verified. Furthermore, during work on the project, new processes were revealed whereby flue gas is desulphurized in a spray-drying apparatus with a slurry of calcium hydroxide. In an extension of the project, tests were carried out which confirmed these findings. The project was abandoned.

43736 (CONF-8208123—, pp 530-542) **Thermal power plant emission: effect on ecosystem.** Thakre, R.; Ramteke, D.S.; Thergaonkar, V.P. (National Environmental Engineering Research Institute Nehru Marg, Nagpur, India). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Gaseous and particulate matter are emitted from thermal power plants. Studies on air, water and soil quality around a thermal power plant having a present capacity of 680 MW were conducted. It is observed that air quality at a control station located in upwind direction has 0.001 ppm sulfur dioxide, while the most polluted station A_1 has 0.045 ppm sulfur dioxide concentration. Water characterisation of wells show high turbidity and conductivity. Concentrations of some major elements like Na, Mg and silica in the river water have increased two- to three-fold in comparison to the data obtained two decades ago. Properties of soil mixed with flyash show that water holding capacity decreases as the flyash content in the soil increases. Such flyash amended soils reduced the germination capacity of wheat and cotton seeds. The soil properties will be further altered since flyash is continuously getting deposited on the soils. Also, water mixed with flyash spreads in the nearby farms which poses soil and water pollution problems by seepage and percolation. Further, the area under study has to be monitored continuously for air, water and soil pollution and effective control measures adopted.

43737 **Impacts of evaporative cooling towers in arid environments.** McBrayer, J.F.; Oakes, K.M. (Oak Ridge National Lab., TN). *Journal of Arid Environments;* **5**: No. 4, 385-398(Dec 1982).

Because of competition for a limited supply of high quality water in the arid regions of the southwestern United States, electric utilities are being compelled to use saline water for evaporative cooling. Some fraction of the water passing through cooling towers inevitably is deposited on the surrounding landscape as drift. Saline drift has a potential for adverse impacts to both agriculture and natural plant communities through increased soil salinization. The potential for increased soil salinization and its impact on vegetation is assessed for cooling towers associated with two proposed energy projects in southeastern California. Severity of impact was found to be associated with the level of salinity of water in the cooling tower, effectiveness of drift eliminators, initial salinity of the receiving soils, salt tolerance of affected vegetation, and potential for removal of salts from soils, either by irrigation or precipitation.

2003 Power Transmission And Distribution

REFER ALSO TO CITATION(S) 43298, 44056

43738 **(NP—3770189) Calculation of reliability characteristics for electric power supply networks.** Gebler, H. (Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Elektrische Enerkgietechnik). 22 Jul 1981. 159p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770189.

Portions are illegible in microfiche products; Thesis.

A selection technique is applied and for every selected failure combination the corresponding network state is analyzed due to the large number of possible failure combinations. The check of the connections between input and load is sufficient in networks up to 110 kV. In 220 kV/380 kV networks overload conditions can be considered by a maximum current calculation. A special technique allows the consideration of the decrease of the power steady state level with time without repeated computation.

43739 **(NP—3770190) Dynamical network feedback of controlled DC drivings with high performance.** Becker, G. (Hochschule der Bundeswehr Muenchen, Neubiberg (Germany, F.R.). Facbereich Elektrotechnik). 19 Feb 1981. 139p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770190.

Thesis.

The network feed-backs are computed for the case of dynamic but undisturbed plant operation of the power electronics, that is represented by controlled, rectifie-supplied high-power DC drives. The models derived are tested in three practical application examples. The influences of the skin and proximity effects can be neglected. However, power-supply operation can be disturbed; therefore unexpected resonances with parts of the network and the consumers should be avoided.

43740 **(NP—3770191) Corrective switching.** Mueller, H. (Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Elektrische Enerkgietechnik). 29 Sep 1981. 189p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770191.

Portions are illegible in microfiche products; Thesis.

The technique developed allows a fast search for suitable network changes, to correct states appearing during overload conditions as well as in preventive calculations. By means of switching techniques a control of the load flow can be obtained. A state correction is possible with these, too, in those cases where other measures would be impossible, uneconomical, or could not be realized fast enough.

43741 **(NP—3770192) Application of process computers for cost-optimal control in power networks.** Strenzke, H. (Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik). 15 Feb 1980. 192p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770192.

Portions are illegible in microfiche products; Thesis.

The main power line characteristic is kept in the model as a control technique, whereby all power plants that are part of the control process can be influenced in their primary control circuits of the rotational and voltage only by the index values via an on-line process computer. The control superimposed by the process computer can be described as a frequency neutral control of line distribution. The voltage control and the reactive power distribution are an indirect control, in which the process-computer acts upon the index values of the uncharged primary voltage control. One can regard this as a reactive power dependent voltage control.

43742 **Theoretical aspects of ionic loss in transmission lines magnetically insulated against electron loss.** Swegle, J. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **54**: No. 6, 3534-3543(Jun 1983). Contract AC04-76DP00789.

Experimentally, it has been established that negative ions cross the anode-cathode gap in transmission lines operating at sufficiently high currents that electrons emitted from the cathode would be magnetically insulated (i.e., deflected back to the cathode by the Lorentz force before reaching the anode). In this paper, a one-dimensional analysis of electron and negative ion emission from a cathode shows that electron emission decreases monotonically to zero as the ion emission increases to the maximum space charge limited value. A second one-dimensional calculation shows that in high current lines, neglecting electron emission, monopolar emission of ions is inhibited by the self-magnetic fields in the line, while bipolar emission is enhanced. Finally, a section is devoted to the approximate solution of several two-dimensional problems using some of the earlier results of this paper, as well as an empirical scaling

law derived by other researchers relating the negative ion current density j/sub n/ to the current per unit width in a line, J: j/sub n/ = KJ^3. In particular, fractional current loss as a function of distance from a load drawing a fixed current is found. An interesting byproduct of this calculation is the demonstration that the empirical scaling law leads to infinite line currents in a finite distance along a planar line, while such a divergence occurs only for certain parameter ranges on radial disk feed lines.

21 NUCLEAR POWER PLANTS

REFER ALSO TO CITATION(S) 43949, 44012

43743 **(DOE/ES—0003/1) History of the Atomic Energy Commission.** Buck, A.L. (USDOE Assistant Secretary for Management and Administration, Washington, DC. Office of the Executive Secretary). Jul 1983. 31p. NTIS, PC A03/MF A01. Order Number DE83015054.

This pamphlet traces the history of the US Atomic Energy Commission's twenty-eight year stewardship of the Nation's nuclear energy program, from the signing of the Atomic Energy Act on August 1, 1946 to the signing of the Energy Reorganization Act on October 11, 1974. The Commission's early concentration on the military atom produced sophisticated nuclear weapons for the Nation's defense and made possible the creation of a fleet of nuclear submarines and surface ships. Extensive research in the nuclear sciences resulted in the widespread application of nuclear technology for scientific, medical and industrial purposes, while the passage of the Atomic Energy Act of 1954 made possible the development of a nuclear industry, and enabled the United States to share the new technology with other nations.

43744 **(EGG-M—02683) Managerial attitude toward quality assurance.** Kirschenmann, H.J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 8p. (CONF-830535—2). NTIS, PC A02/MF A01. Order Number DE83015138.

From 37. annual American Society for Quality Control congress; Boston, MA, USA (24 May 1983).

Portions are illegible in microfiche products.

This paper will present what relationships exist between the attitude toward quality assurance and the variables of training and experience on the part of managers within the nuclear power industry. Managerial attitude toward quality assurance was measured via questionnaires submitted to managers within architect-engineering, nuclear steam supplier, and constructor firms throughout the United States. The data from the completed questionnaires were statistically analyzed using the chi-square test and conclusions were drawn. Additional study results related to major factors for positive and negative attitudes toward quality assurance will be presented.

2101 Power Reactors, Non-breeding, Light-water Moderated, Boiling Water Cooled

REFER ALSO TO CITATION(S) 43820, 43821, 43822, 43823, 43829, 43873, 43879, 43899, 43902, 43904, 43905, 43906, 43907, 43912, 43930, 43934, 43935, 43939, 43940, 43942, 43947, 43950, 43951, 43955, 43956, 43958, 43966, 43967, 44175, 44178, 44180, 44181, 44188, 44189

43745 **(DOE/ET/34031—13) VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor.** Esch, E.L.; Hoshi, E.V.; Richards, J.E. (General Electric Co., San Jose, CA (USA). Nuclear Engineering Div.). Mar 1983. Contract AC02-80ET34031. 80p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83015327.

Six high-exposure fuel rods from an 8 x 8 fuel bundle were examined at the Vallecitos Nuclear Center (VNC) hotcells as part of a Department of Energy sponsored BWR Fuel Bundle Extended Burnup Program. The fuel rods were from Fuel Bundle MTB-072 which had been discharged from the Monticello reactor in February 1980 at an average exposure of 33.8 GWd/MT. This report presents results of the visual examinations, neutrography, coil and pulsed eddy current testing, crud analyses, clamshell studies and metallographic examinations.

43746 **(DOE/SR/00952—T1) Nuclear-fuel-cycle education: Module 4. Fuel element design.** Weisman, J.; Eckart, L. (Cincinnati Univ., OH (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 124p. NTIS, PC A06/MF A01. Order Number DE83015552.

Portions are illegible in microfiche products.

This module briefly reviews the early development of those fuel designs that lead to the selection of the zircaloy-UO_2 fuel rod which is used in the present generation of light water reactors (LWR). Fuel element design for the LMFBR and for advanced converter reactors will also be presented. The module will emphasize the design characteristics of the zircaloy-UO_2 fuel rods used in LWR system. To develop a basic understanding of the LWR system, the module will also describe: the UO_2 fuel rods and assemblies; the thermal and mechanical design properties characteristic of both normal and transient operations; the physical properties of fuel and cladding; the behavior during reactor irradiation of the fuel and cladding; and a simple fuel rod design code applicable with minimum input preparation. Completion of this module should enable the student to prepare a simple preliminary design of a fuel rod for an LWR with the data available by using the analysis techniques presented in the module. Additionally, the student should be prepared to extend this knowledge to other fuel rod design concepts, e.g., those for the LMFBR and for advanced reactor system fuel rods.

43747 **(EGG-M—09883) Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup.** Appelhans, A.D.; Turnbull, J.A.; White, R.J. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 12p. (CONF-830563—3). NTIS, PC A02/MF A01. Order Number DE83015139.

From Enlarged halden program group meeting; Loen, Norway (23 May 1983).

Portions are illegible in microfiche products.

The release of fission products from fuel pellets to the fuel-cladding gap is dependent on the fuel temperature, the power (fission rate) and the burnup (fuel structure). As part of the US Nuclear Regulatory Commission's Fuel Behavior Program, EG & G Idaho, Inc., is conducting fission product release studies in the Heavy Boiling Water Reactor in Halden, Norway. This paper presents a summary of the results up to December, 1982. The data cover fuel centerline temperatures ranging from 700 to 1500°C for average linear heat ratings of 16 to 35 kW/m. The measurements have been performed for the period between 4.2 and 14.8 GWd/t UO_2 of burnup of the Instrumented Fuel Assembly 430 (IFA-430). The measurement program has been directed toward quantifying the release of the short-lived radioactive noble gases and iodines.

43748 **(EGG-M—28682) Kalman filter-based gap conductance modeling.** Tylee, J.L. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 7p. (CONF-830609—35). NTIS, PC A02/MF A01. Order Number DE83015121.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

Geometric and thermal property uncertainties contribute greatly to the problem of determining conductance within the fuel-clad gas gap of a nuclear fuel pin. Accurate conductance values are needed for power plant licensing transient analysis and for test analyses at research facilities. Recent work by Meek, Doerner, and Adams has shown that use of Kalman filters to estimate gap conductance is a promising approach. A Kalman filter is simply a mathematical algorithm that employs available system measurements and assumed dynamic models to generate optimal system state vector estimates. This summary addresses another Kalman filter approach to gap conductance estimation and subsequent identification of an empirical conductance model.

43749 **(IPEN-Pub—41) Application of an automatic pattern recognition for aleatory signals for the surveillance of nuclear reactor and rotating machinery.** do Nascimento, J.A. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Engenharia Nuclear). Feb 1982. 18p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702144.

An automatic pattern recognition program PSDREC, developed for the surveillance of nuclear reactor and rotating machinery is described and the relevant theory is outlined. Pattern recognition analysis of noise signals is a powerful technique for assessing 'system normality' in dynamic systems. This program, which applies 8 statistical tests to calculated power spectral density (PSD) distribution, was earlier installed in a PDP-11/45 computer at IPEN. To analyse recorded signals from three systems, namely an operational BWR power reactor (neutron signals), a water pump and a diesel engine (vibration signals) this technique was used. Results of the tests are considered satisfactory.

43750 (NIIAR—3(518)) **Experimental study on hydrodynamics of the up-draught part of the VK-50 boiling water reactor.** Fedulin, V.N.; Shmelev, V.E.; Solodkij, V.A.; Kharitonov, Yu.V. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702146.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 6 figs.

The investigation results on steam content distribution in the volume of the up-draught part of the VK 50 reactor on the basis of the electrical sounding method are presented. The operating conditions of the up-draught part of a large diameter and limited height is characterized by hydrodynamic non-uniformity of distribution of steam content field over its volume. In the up-draught part of the reactor owing to its limited height hydrodynamic flow stabilization over the section is not attained. The higher void fraction in the central region of the up-draught part (owing to higher energy release in the centre of the core) causes accelerated coolant motion upwatds which results in steam migration from the periphery to the centre and to increase of general non-uniformity of steam distribution. The revealed steam distribution non-uniformity over the height and radius of the up-draught part elucidates the discrepancy of experimental and calculation values of the average volumetric steam content and determines the necessity of the development of new calculation methods.

43751 (NUREG/CP—0044-Vol.1) **Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions I and II. Vol. 1.** Cullen, W.H. (ed.). (Materials Engineering Associates, Inc., Lanham, MD (USA)). May 1983. 315p. (MEA—2014; CONF-8105220—). NTIS, PC A14/MF A01 - GPO $7.50. Order Number DE83902448.

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Portions are illegible in microfiche products.

Separate abstracts were prepared for twelve papers in this proceedings. (LEW)

43752 (NUREG/CP—0044-Vol.1, pp 109-128) **Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels.** Cullen, W.H. (ENSA, Inc., Buffalo, NY); Loss, F.J.; Watson, H.E. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Test results which define the influence of waveform, temperature, load ratio and environment on fatigue crack growth of reactor pressure vessel steels in simulated reactor primary coolant environments are illustrated and described. The results of two test matrices are included. The first, called the preliminary test matrix, was aimed at the determination of crack growth rates for a single material, A508-2, but for a wide variety of waveforms and temperatures. The second, or main matrix for unirradiated materials, was aimed at determining growth rates for a variety of reactor pressure vessel steel plates, forgings and submerged-arc welds, but for two waveforms and two load ratio selections. The results, and their significance for design and in-service inspection related safety analyses, are described in this article. The trends observed in the available data and the areas in need of additional research are identified.

43753 (NUREG/CP—0044-Vol.1, pp 129-140) **Experience with an autoclave-refreshing system for crack growth measurements under PWR- and BWR-environmental conditions.** Gerscha, A.; Klausnitzer, E.; Wieling, N. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

The design and operation of a refreshing system serving several cyclically operated autoclaves are described. In this system, demineralized water is degassed at 90°C with N_2 and then cooled down again to 20°C. The water is then mixed with additives, preheated, and pumped into the autoclave. Water leaving the autoclave is cooled back and drained. Oxygen concentration is checked continuously. (LEW)

43754 (NUREG/CP—0044-Vol.1, pp 179-192) **Fatigue crack growth through typical weld HAZ microstructures of SA 533 Gr. B steel in BWR water environment.** Kondo, T.; Nakajima, H.; Takahashi, H.; Shoji, T. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Cyclic crack growth behaviour of SA 533 Gr.B steel specimens with microstructures of simulated weld heat-affected zone was examined by testing the materials having a common origin but different thermal history in a typical BWR type water environment. The variation of the heat treatment employed was provided by reproducing the three typical microstructures; i.e. (1) Base metal-air quenched and tempered, (2) Fine grained bainitic portions at HAZ-oil quenched and tempered, and (3) Coarse grained martensitic portions at HAZ, each of which was to simulate the local microstructural constituent appearing along the fusion lines periodically. In order to be consistent with the previous work on the actual HAZ specimens in the methodological bases crack growth rate measurements were made using constant ΔK type contoured double cantilever beam rate (CDCB) specimens of 30 mm thickness. The test environment used was 288°C water containing 100 +- 50 ppB oxygen, which was prepared by distilling and deionizing processes, and was fed to the test section at the continuous refreshing rate of 1000 ml/min.. No essential difference in the behaviour was noted among all types of materials in the test conditions employed when tests were made in ambient air. In the tests with the BWR type environment all the materials showed some accelerated crack growth relative to the corresponding air results. It was specially noted that the degrees of the acceleration were dependent on the microstructure as had been observed on the actual weld-HAZ only when higher stress(load)ratio, ie. R = 0.5 was given, while no notable difference was noted with R = 0.1. The highest susceptibility to the environment-enhanced cracking was shown by the hardest (martensitic) material. Based on the measurements of the residual tensile stresses around the weld HAZ portions, an interpretation was made as that the residual stress acted to increase the stress ratio in the specimens taken from the HAZ.

43755 (NUREG/CP—0044-Vol.2, pp 295-301) **Device for investigating subcritical crack growth of RPV steel specimens under BWR conditions.** Anders, D.; Ahlf, J. (GKSS-Forschungszentrum, Geesthacht, Germany). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth.

An experiment is being prepared to investigate the subcritical crack growth of RPV steel specimens under cyclic load and under the environmental conditions of a BWR with regard to primary water and irradiation. The experiment will be carried out in the VAK reactor Kahl which is a boiling water reactor operating at 71 bar, 286°C and generating 16 MW/sub e/. The experimental setup is composed of an open frame to which a string consisting of five compact tension speciments (40 mm thickness) and connecting links is fixed. The specimen chain is set under cyclic load by a pneumatically actuated bellows unit which is attached to the frame top. Specimen strain and crack opening are measured by linear dif-

ferential transformers; for temperature distribution measurements in the specimens thermocouples are applied.

43756 **(NUREG/CR—2884) Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation.** Divine, J.R.; Woodruff, E.M.; McPartland, S.A.; Zima, G.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 57p. (PNL—4343). NTIS, PC E04/MF A01 - GPO $6.00. Order Number DE83014580.

Includes 2 sheets of 24x reduction microfiche.

As part of the US Nuclear Regulatory Commission's program to reduce occupational exposure and waste volumes, the Pacific Northwest Laboratory is studying decontamination as a precursor to decommissioning. Eleven processes or solvents were examined for their behavior in decontaminating BWR carbon steel samples. The solvents included NS-1, a proprietary solvent of Dow Chemical Corporation, designed for BWR use, and AP-Citrox, a well-known, two-step process designed for PWR stainless steel; it was used to provide a reference for later comparison to other systems and processes. The decontamination factors observed in the tests performed in a small laboratory scale recirculating loop ranged from about 1 (no effect) to 222 (about 99.6% of the initial activity removed. Coordinated corrosion measurements were made using twelve chemical solvents and eight metal alloys found in a range of reactor types.

43757 **(NUREG/CR—3085-Vol.3) Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8.** Curry, J.J.; Gallagher, D.W.; Modarres, M.; Radder, J.A. (Science Applications, Inc., Bethesda, MD (USA)). May 1983. Contract AC04-76DP00789. 773p. (SAND—82-7212-Vol.3). NTIS MF A01 - GPO. Order Number DE83015411.

Microfiche only, copy does not permit paper copy reproduction.

Appendices are presented concerning the low pressure coolant injection system; isolation condenser system; automatic pressure relief system; and shutdown cooling system.

2102 Power Reactors, Non-breeding, Light-water Moderated, Non-boiling Water Cooled

REFER ALSO TO CITATION(S) 43391, 43746, 43747, 43748, 43751, 43752, 43753, 43756, 43820, 43821, 43822, 43823, 43826, 43829, 43830, 43830, 43831, 43869, 43871, 43873, 43876, 43877, 43879, 43896, 43897, 43898, 43899, 43900, 43902, 43903, 43904, 43905, 43907, 43910, 43912, 43913, 43915, 43916, 43917, 43918, 43919, 43921, 43929, 43931, 43932, 43933, 43934, 43935, 43937, 43938, 43939, 43940, 43942, 43950, 43951, 43955, 43956, 43964, 43965, 43966, 44178, 44179, 44180, 44181, 44182, 44192

43758 **(CEA-CONF—6353) TRIPOLI.2. A 3D Monte Carlo system for thermal reactor applications.** Baur, A.; Bourdet, L.; Dejonghe, G.; Gonnord, J.; Monnier, A.; Nimal, J.C.; Vergnaud, T. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). May 1982. 18p. (CONF-820566—10). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701800.

From Thermal reactor benchmark calculations, techniques, results and applications seminar; Upton, NY, USA (17 May 1982).

TRIPOLI.2 solves the Boltzmann equation for source and critical problems, time depending or not, by the Monte Carlo method. The code can handle all types of interactions and uses a library processed from ENDF/B. Special attention has been given to the resonance region processing and to the thermal kernel treatment. Sampling using the free gas and the S (α, β) model is described in details. The three dimensional geometry is composed of volumes limited by any portion of linear or quadratic surfaces. Extended facilities to process the output are provided. Two comparisons with experiment and computational benchmark are presented: comparison of a calculated spectra in borated water with measurements; computational benchmark of a standard PWR cell showing the influence of cross section data (UKNDL-ENDF/B4-ENDF/B5).

43759 **(CEA-CONF—6371) Pattern recognition method for nuclear reactor core surveillance.** Invernizzi, M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Jun 1982. 14p. (In French). (CONF-8206165—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701801.

From IAEA specialist meeting on early diagnosis of failures in primary system components; Prague, Czechoslovakia (19 Jun 1982).

An automatic surveillance principle based on a pattern recognition approach is described. The recognition is performed among a set of normal kind of working classes obtained by an unsupervised training. A recognition likehood criterion is used as abnormality decision rule. No hypothesis is made concerning the notion of abnormality. It is defined in opposition with a training data base assumed to be an exhaustive summary of normal behaviours. A core vibration surveillance method for a pressurized water reactor is developed. One of the aims of this study is the early detection of failures. The method allows on line applications and is able to give quick surveillance decisions (about one minute). The sensors are the four ex-core neutron ionization chambers. The extracted features are the characteristics of the neutron noise power spectrum densities resonances. The system is very flexible and adaptable to the statistical properties of the data. The abnormality decision rule severity is adjustable by a sensitivity parameter. The algorithms are heuristic but need only the definition of a small number of parameters. These parameters are optimized either by automatic procedures or by explicit experimental methods. The system is applied on data from a French 900 MW nuclear power reactor. A false alarm probability estimation is carried out by letting the surveillance process work on unknown normal data. Abnormality detection probability is calculated with several kinds of simulated abnormalities by adding a parasit frequency or a white noise. The experimental results obtained by the surveillance system validate the retained principle.

43760 **(CEA-CONF—6375) PICOLO 2 simulator. Programming and application to teaching.** Salomon-Sigogne, A.; Bonnemay, A. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Jul 1982. 3p. (In French). (CONF-8206166—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701802.

From 2. international symposium on applied modeling and simulations; Paris, France (29 Jun 1982).

This paper presents the salients features of PICOLO 2, a simulation tool for teaching and its use in Nuclear Engineering teaching.

43761 **(CEA-CONF—6391) Implementation of a pressurized water reactor simulator for teaching on a mini-computer.** Tallec, M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Jun 1982. 5p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701803.

This paper presents the design of a pressurized water reactor power plant simulator using a mini-computer. This simulator is oriented towards teaching. It operates real-time simulations and many parameters can be changed by the student during execution of the digital code. First, a state variable model of the dynamic behavior of the plant is derived from the physical laws. The second part presents the problems associated with the use of a mini-computer for the resolution of a large differential system, notably the problems of memory-space availability, execution time and numerical integration. Finally, it contains the description of the control deck outlay used to interfer with the digital code, and of the the conditions that can be changed during an excution.

43762 **(CEA-CONF—6459) Irradiation in the CAP reactor of FRAGEMA fuel assemblies under power transients representative of super imposed load follow and remote control regimes.** Puill, A.; Fremiot, C.; Mabile, M.; Melin, P.; Ponticq, M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 18p. (CONF-8209120—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702147.

From IAEA specialists' meeting on power ramping and cycling behaviour of water reactor fuel; Petten, Netherlands (8 Sep 1982).

The CAP (Chaufferie Avancee Prototype) is a pressurized water research reactor of about 100 MWth located at the Nuclear Center of Cadarache. In 1978, four fuel asemblies of current design for the French PWR's were loaded; the objective of this experiment was to test the reference fuel under superimposed daily load follow (power reduction to 75%, 50% or 30% of the rated power during 6 hours) and remote control (power level change of approximately +- 5%) regimes. The rated power of the CAP reactor was selected to give the same rod linear ratings as in a 900 MW.PWR. The local changes in power during a reactor transient had been previously analyzed and reproduced in the CAP reactor by the motion of the control rods and power changes. The campaign was successfuly carried out without any fuel problem and, after unloading the core, the sipping-tests and subsequent PIE did not show any cladding failure. These irradiations provide representative information for the evaluation of fuel behaviour under severe power cycling conditions and are completed by non-destructive and destructive examinations and tests performed on characterized fuel rods removed from the assemblies at the end of each cycle.

43763 **(CEA-CONF—6460) In-service inspection of reactors.** Saglio, R. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 37p. (In French). (CONF-8209121—1). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702148.

From Inter-regional training course on assuring pressure boundary integrity; Argonne, IL, USA (8 Sep 1982).

The equipment is described for in-service inspection of PWR pressure vessels and inspection of steam generator tubes by focussed ultrasonics and multi-frequency eddy currents.

43764 **(DLCS—5000183) Quarterly operating report, first quarter 1983.** (USDOE Pittsburgh Naval Reactors Office, West Mifflin, PA). 1983. Contract AC11-76PN00292. 15p. NTIS, PC A02/MF A01. Order Number DE83015551.

At the beginning of the first quarter of 1983, the Shippingport Atomic Power Station remained shutdown for defueling with one Core Removal Cooling Pump in service and the Reactor Coolant System depressurized and borated to approximately 6000 ppM boron. In parallel with defueling, the station is being prepared for turnover to a decommissioning agency. During the quarter, the reactor vessel water level was lowered to 707.7 feet and the CWST and the deep pit section of the canal were borated to approximately 4600 ppM boron. The LWBR Core has generated 28,730.41 EFPH from startup through the final shutdown on October 1, 1982. The radioactivity released from Shippingport during the first quarter of 1983, is far too small to have any measurable effect on the general background environmental radioactivity outside the plant.

43765 **(FEI—1268) Program for computation of transition processes in the tube bundle of a steam generator module (DINAMO-2).** Parafilo, L.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702140.

9 refs.; 5 figs.

The technique for calculation of transient processes in a steam generator once-through straight tube module is described. The module represets an axially symmetric tube casing vertical heat exchanger with radial hot coolant entrance and exit the straight-line tube bundle in which are fixed to upper and lower tube plates. The medium in tubes may be in any state between the subcooled liquid and superheated steam. For the described module the temperature fields and distributions of parameters of the heated medium in tube bundle, namely the flow rates, pressures, enthalpies as well as axial strains caused by variations in flow rate, pressure, inlet enthalpy and coolant inlet temperature are calculated.

43766 **(FEI—1275) EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms.** Goryunov, V.K. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702134.

Paper copy only, copy does not permit microfiche production refs.

The correction technique for physical calculation of energy yield fields by measurement results in the separate reactor assemblies contained in the EREBUNI program is outlined. The technique is based on the maximum likelihood principle for conjugation of calculational and experimental information and takes into account spatial correlations of physical calculation errors. The analytical evoluation of correction results accuracy is given.

43767 **(FRNC-TH—1077) Temperature effects studies in light water reactor lattices.** Erradi, L. (Paris-11 Univ., 91 - Orsay (France)). Feb 1982. 219p. (In French). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83780928.

Thesis.

The CREOLE experiments performed in the EOLE critical facility located in the Nuclear Center of CADARACHE - CEA (UO_2 and UO_2-PuO_2 lattice reactivity temperature coefficient continuous measurements between 20°C and 300°C; integral measurements by boron equivalent effect in the moderator; water density effects measurements with the use of over cladding aluminium tubes to remove moderator) allow to get an interesting and complete information on the temperature effects in the light water reactor lattices. A very elaborated calcurated scheme using the transport theory and the APOLLO cross sections library, has been developed. The analysed results of the whole lot of experiments show that the discrepancy between theory and experiment strongly depends on the temperature range and on the type of lattices considered. The error is mainly linked with the thermal spectrum effects. A study on the temperature coefficient sensitivity to the different cell neutron parameters has shown that only the shapes of the ^{235}U and ^{238}U thermal cross sections have enough weight and uncertainty margins to explain the observed experimental/calculation bias.

43768 (INIS-mf—7501, pp vp) **Direct measurement of physical and chemical parameters in reactor circuits at high pressure and temperature of water.** Zajic, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). 1980. (In Czech). NTIS (US Sales Only), PC A06/MF A01. (CONF-8010312—).

From VOREM 80 conference; Brno, Czechoslovakia (30 Oct 1980).

Sensors with continuous remote read-out were developed for monitoring radiation-exposed water regimes. A conductometric and corrosionmetric case was developed for pressures up to 20 MPa and temperatures up to 300 degC while a pH-meter case was developed for a pressure of 20 MPa and a temperature of 60 degC. The capacity of these through-flow sensor cases is 200 to 300 ml; their descriptions and pictures are given. Long-term testing showed that the devices are also suitable for use in radioactive environment. Their application increased productivity in data collection and reduced the time required for monitoring, research and control of water regimes.

43769 **(INIS-mf—7614) Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components.** Rahn, K.M.M.; Jusevicius, E.; Michael, H. (Acos Villares S.A., Sao Caetano do Sul (Brazil)). 1981. 16p. (In Portuguese). (CONF-8107102—16). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780920.

From 36. annual conference of Brazilian Association of Metals; Recife, Brazil (5 Jul 1981).

The process for the qualification of 'Sao Caetano do Sul (Acos Villares S/A)' Plant as manufacturers of ingot iron pieces for application in components of Angra 2 and Angra 3 Nuclear Power Plants, is presented. The qualification was executed by IBQN - Instituto Brasileiro de Qualidade Nuclear - the organization officially

in charge of the execution of qualification of suppliers of materials for the nuclear industry.

43770 (INIS-mf—7625) **Post irradiation examination on test fuel pins for PWR.** Fogaca Filho, N.; Ambrozio Filho, F. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Metalurgia Nuclear). 1981. 12p. (In Portuguese). (CONF-8107102—17). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780929.

From 36. annual conference of Brazilian Association of Metals; Recife, Brazil (5 Jul 1981).

Certain aspects of irradiation technology on test fuel pins for PWR, are studied. The results of post irradiation tests, performed on test fuel pins in hot cells, are presented. The results of the tests permit an evaluation of the effects of irradiation on the fuel and cladding of the pin.

43771 (INIS-mf—7635) **Thermal stresses in a PWR pressure vessel.** Bassel, W.S.; Dieguez, J.A.D. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)). 1981. 10p. (In Portuguese). (CONF-811273—34). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780930.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A method for calculating the thermal stresses in the cylindrical part of a PWR pressure vessel was developed. The thermal stresses studied were created by radial temperature gradient during Emergency Core Cooling System operation or during plant cooling down. The stress distribution was obtained by using the concept of plain strain for hollow cylinder. The limiting condition for maximum sudden decrease in temperature which should not cause plastic collapse on the pressure vessel was concluded to be 210 °F.

43772 (INIS-mf—7637) **Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor.** Braga, C.V.M.; Carajilescov, P. (Pontificia Univ. Catolica do Rio de Janeiro (Brazil)). 1981. 13p. (In Portuguese). (CONF-811273—35). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780931.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Generally, 'U' tube steam generators with natural internal recirculation are used in PWR power stations. A thermalhydraulic model is developed for simulation of such components, in steady state. The flow of the secondary cycle fluid is divided in two parts individually homogeneous, allowing for heat and mass exchange between them. The secondary pressure is determined by defining the moisture of the vapor that feeds the turbine. This model is applied to the Angra II steam generator, operating in nominal conditions and with tubing partially plugged.

43773 (INIS-mf—7646) **New model for simulation of pressurizers in PWR type reactors.** Madeira, A.A.; de Oliveira Barroso, A.C. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. 13p. (In Portuguese). (CONF-811273—36). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780932.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The pressurizer is treated as three-homogeneous region thermodynamic system, whith movable boundaries, all regions considered under the same pressure. In Normal operation, the two botton regions are occupied by water (liquid), and steam occupies the top region. Normal and spray induced condensation processes, evaporation and heat transfer cross the steam-water interface are analysed. The liquid region at the very botton of the pressurizer is treated in a simplyfied manner in order to retain the computacional advantages of the two-region models.

43774 (INIS-mf—7654) **Semi-analytical study of the vibrations induced by flow in the piping of nuclear power plants.** Maneschy, J.E. (FURNAS, Rio de Janeiro (Brazil)). 1981. 8p. (In Portuguese). (CONF-811273—37). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780933.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A semi-analytical method is presented to evaluate the piping system safety due to internal flow vibration excitation. The method is based on the application of a plane spectrum on the system, resulted by measured modal accelerations. A criteria is established to verify stress levels and compare with the allowable levels.

43775 (INIS-mf—7666, pp vp) **Comparative study of fuel management in PWR reactors.** Barroso, D.E.G.; Nair, R.P.K.; Vellozo, S.O. (Instituto Militar de Engenharia, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A study about fuel management in PWR reactors, where not only the conventional uranium cycle is considered, but also the thorium cycle as an alternative is presented. The final results are presented in terms of U_3O_8 demand and SWU and the approximate costs of the principal stages of the fuel cycle, comparing with the stardand cycle without recycling.

43776 (INIS-mf—7666, pp vp) **Anticipated simulation of Angra-1 start-up physical tests.** Fernandes, V.B.; Perrotta, J.A.; da Silva Ipojuca, T.; Ponzoni Filho, P. 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

Some results foreseen by the Department of Nuclear Fuel (DCN. O) in Furnas for the measurements that will be realized during the start-up integrated tests for Angra-1 are presented. All the forecasting is based on a DCN.O proper correlation methodology, developed from basic physical principles, using computer codes developed by the authors or public computer codes adapted to this methodology.

43777 (INIS-mf—7666, pp vp) **Transient analysis models for nuclear power plants.** Agapito, J.R. (FURNAS, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The modelling used for the simulation of the Angra-1 start-up reactor tests, using the RETRAN computer code is presented. Three tests are simulated: a) nuclear power plant trip from 100% of power; b) great power excursions tests and c) 'load swing' tests.

43778 (INIS-mf—7666, pp vp) **Protection set-points lines for the reactor core and considerations about power distribution and peak factors.** Furieri, E.B. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

In order to assure the reactor core integrity during the slow operational transients (power excursion above the nominal value and the high coolant temperature), the formation of a steam film (DNB-Departure from Nucleate Boiling) in the control rods must be avoided. The protection set points lines presents the points where DNBR (relation between critical heat flux-q sub(DNB) and the local heat flux-q' sub(local) is equal to 1.30, corrected by peak factors and uncertainty in function of ΔTr and T sub(R), respectively coolant elevation and medium coolant temperature in reactor pressure vessel. The curve set-points were determined using a new version of COBRA-IIIF (CUPRO) computer code, implemented with new subroutines and linearized convergence scheme. Pratical results for Angra-1 core were obtained and its were compared with the results from the fabricator.

43779 (NUREG/CP—0044-Vol.1, pp 7-40) **Corrosion fatigue crack growth of pressure vessel welds in PWR environment.** Bamford, W.H.; Ceschini, L.J.; Moon, D.M. (Westinghouse Electric Corp., Pittsburgh, PA). May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

The fatigue crack growth rate behavior of several pressure vessel steel welds in PWR environment will be discussed. The behavior will be compared with associated heat-affected zone behavior, and with comparable base metal results. The welds show different degrees of susceptibility to the environmental influence, and this will be discussed in some detail, along with fractographic observations on the tested specimens.

43780 (NUREG/CP—0044-Vol.1, pp 41-64) **Investigation of fatigue crack growth in SA508-2 in a 288°C PWR environment by a constant ΔK test method.** Van Der Sluys, W.A.; DeMiglio, D.S. (Babcock and Wilcox, Alliance, OH). May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Fatigue crack growth experiments using a constant ΔK test technique were conducted on three 50.8 mm thick compact fracture specimens of SA508-2 in a 288°C simulated PWR water environment. Alternating stress intensity factor (ΔK) values were investigated in the range 16.5 to 44 MPa√m at sinusoidal loading frequencies ranging from 10 to .017 Hz (1 cpm) and R ratios 0.03 to 0.72. For a given ΔK and frequency, ΔK was held constant to within 1%. A steady-state rate of crack growth per cycle of stress (da/dN) was determined for each test condition. Over a typical crack extension of 1.3 mm, the crack growth rate in many cases was a constant. As many as 14 separate experiments were conducted on a single specimen. There was no influence of prior loading history or crack length on the crack growth rate. It was found that the crack growth rate was controlled by the ΔK, frequency, and R ratio of the test. Large changes in the crack growth rate did not occur as the frequency of loading was decreased from >1 Hz to .017 Hz (1 cpm). As compared to high frequency results (>1 Hz) the crack growth rate increased slightly at 1 cpm for $\Delta K > 22$ MPa√m and decreased slightly for $\Delta K < 22$ MPa√m. At 1 cpm the R ratio was observed to influence the crack growth rate; however, the magnitude of this effect was not well-defined.

43781 (NUREG/CP—0044-Vol.1, pp 89-108) **Fatigue crack growth rates of irradiated pressure vessel steels in simulated nuclear coolant environment.** Cullen, W.H. (ENSA, Inc., Buffalo, NY); Watson, H.E.; Taylor, R.A.; Loss, F.J.; Spencer, H.A. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Fatigue crack growth rates, in a simulated pressurized water reactor primary loop environment, are presented for A508-2, A533-B steels and submerged arc weld metal (Linde 0091 flux) in both the irradiated and unirradiated conditions. The initial results, for specific experimental conditions, constant load amplitude waveforms, and load ratio = 0.2, indicate that irradiation does not enhance fatigue crack growth rates more than the enhancement due to the environment alone. Fractographic examination of the fatigue fracture surfaces showed that the crack propagated by a ductile striation formation mechanism. This article outlines the experimental techniques involved in this testing and describes the results and their possible significance with respect to the existing safety analysis codes.

43782 (NUREG/CP—0044-Vol.1, pp 141-178) **Crack growth resistance of low alloy steel in high temperature oxygenated water.** Hale, D.A.; Lange, C.H.; Kass, J.N. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Crack growth rates for Low Alloy Steel in high temperature, high purity oxygenated water were studied under cyclic loading conditions. Both fracture mechanics and simulated reactor pressure vessel nozzle test specimens were utilized. Cycle frequency, mean stress, and coolant oxygen content were studied. The role of crack face oxidation in mitigating crack growth rates was identified. The overall data band is similar to that reported in the literature for Pressurized Water Reactor conditions. The overall impact of the study is that disposition of indications potentially found by future in-service inspections can be made with improved confidence since the resistance to crack extension is quite high.

43783 (NUREG/CP—0044-Vol.1, pp 263-294) **Effects of PWR environment on the fatigue crack growth of different stainless steels and inconel type alloy.** Amzallag, C. (Creusot-Loire, Centre de Recherches, Firminy, France); Baudry, G.; Bernard, J.L. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

The fatigue crack growth rate (FCGR) of the main materials (Ni base alloys, and stainless steels) in contact with the primary coolant of pressurized water reactors have been investigated. Attention was paid to environmental (temperature, reactor coolant hot water, frequency) and metallurgical parameters (grain size, delta ferrite content, thermal aging). Depending on the type of materials, different behaviours were found. In general, temperature and PWR environment appear as the more important parameters for FCBR.

43784 (NUREG/CP—0044-Vol.2, pp 67-90) **Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions.** Blind, D.; Sturm, D.; Trunk, H. (Univ. Stuttgart, Germany). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Metallographic and fractographic investigations have been carried out at a 2 T-WOL-specimen of A 508-2 material with which a corrosion fatgue test under PWR-conditions has been performed. There was observed a remarkable accelertion of crack growth rate reducing frequency of fatigue load from 1 Hz to 17 mHz for a limited number of cycles referred to about 3 mm crack growth. In this region of accelerated crack growth the mechanism of tough fatigue crack propagation appears to change mainly to brittle fatigue crack growth along cleavage planes. The reason for the acceleration of crack growth may be causally the hydrogen crack tip embrittlement which is promoted by a longer exposure time for hydrogen under stress. The crack tip embrittlement may also be assisted by 300°C tempering (ageing) effect.

43785 (NUREG/CR—3161) **Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982.** Dodd, C.V.; Deeds, W.E.; McClung, R.W. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 12p. (ORNL/TM—8741). NTIS, PC A02/MF A01 - GPO. Order Number DE83015001.

Eddy-current inspection is the most-suitable method for rapid boreside evaluation of steam-generator tubing. However, small flaws can be masked by the effects of harmless variables such as tube supports. To identify the critical properties accurately and reliably in the presence of extraneous signals caused by variations of unimportant properties, sufficient information is needed to identify harmful variations and to reject harmless ones. For this reason instrumentation has been developed that is capable of measuring both the amplitude and phase of the eddy-current signal at several different frequencies as well as computer equipment capable of processing the data quickly and reliably. The probes and test conditions are also computer-optimized. The most-recent probe design embodies an array of small flat pancake coils and promises to improve the detection of small flaws and the rejection of tube support signals.

43786 **(NUREG/CR—3333) Neutron spectral characterization of the fourth Nuclear Regulatory Commission Heavy Section Steel Technology IT-CT irradiation experiments: dosimetry and uncertainty analysis.** Stallmann, F.W.; Baldwin, C.A.; Kam, F.B.K. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 50p. (ORNL/TM—8789). NTIS, PC A03/MF A01 - GPO. Order Number DE83015660.

In support of the fourth series of the Heavy Section Steel Technology metallurgical irradiation experiment, which is sponsored by the Nuclear Regulatory Commission, a complete spatial map of damage-exposure-parameter values has been determined for each of the four metallurgical capsules. The values of fluence > 1.0 MeV, fluence > 0.1 MeV, and displacements per atom are determined using a least-squares logarithmic (LSL) adjustment procedure with input values taken from extensive dosimetry measurements and neutron-transport calculations. Adjustments were made globally, processing simultaneously the dosimetry measurement at different locations and from different capsules. Using this procedure, uncertainties for the damage-exposure-parameter values can be reduced to less than 8% standard deviation.

43787 **(PNL-SA—10818) Comparison of occupational dose estimates for TMI-2 recovery operation.** Hoenes, G.R. (Pacific Northwest Lab., Richland, WA (USA)). Oct 1982. Contract AC06-76RL01830. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83015088.

This report summarizes a comparative analysis and appraisal of the occupational dose estimates for TMI-2 recovery made by Bechtel for General Public Utilities and those made in the Programmatic Environmental Impact Statement (PEIS) by Argonne National Laboratory (ANL) for the Nuclear Regulatory Commission (NRC). The total occupational doses estimated by the two organizations vary considerably. The estimates made by ANL are a factor of 3 to 4.5 lower than those made by Bechtel. Most of this difference is a result of estimates made for one step in the recovery operations: decontamination of the reactor building. Estimates for this task made by ANL are a factor of 7 to 10 lower than those made by Bechtel. This discrepancy could be attributed to large differences in assumptions about time needed to accomplish the job or about radiation exposure rates. This possibility was investigated. The purpose of the analysis was to determine and evaluate the basic differences in the estimates.

43788 **(UNI-SA—114) Development of magnetic filters for the primary-coolant circuit of a PWR.** Emory, B.B. (UNC Nuclear Industries, Inc., Richland, WA (USA)). 16 May 1983. Contract AC06-76RL01857. 7p. (CONF-810425—8). NTIS, PC A02/MF A01. Order Number DE83015300.

From International conference on metallurgical coatings; San Francisco, CA, USA (6 Apr 1981).

Portions are illegible in microfiche products.

This paper presents results of on reactor and laboratory loop testing of high-gradient magnetic filters for application to the primary-coolant circuit of a pressurized-water reactor. Testing has progressed to the point that a large-scale prototype filter of approximately 450T/h capacity is planned for installation on the US DOE N Reactor in 1985. Selected results of this test program are presented including filter efficiency with respect to flow and field strength and analysis of collected reactor crud. General design parameters for a full-scale filter are presented.

2103 Power Reactors, Non-breeding, Graphite Moderated

REFER ALSO TO CITATION(S) 43746, 43829, 43833, 43848, 43879, 43909, 43922, 43927

43789 **(CEA-CONF—6471) Corrosion and the corrosion inhibition effects in the BUGEY 1 reactor.** Montagne, M.; Blanchard, R.J. (CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)). Sep 1982. 19p. (In French). (CONF-820915—7). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702152.

From BNES international conference on gas cooled reactors today; Bristol, UK (20 Sep 1982).

The Bugey-1 reactor diverged 10 years ago, this paper gives problems met during this period concerning graphite corrosion and fouling by radiolysis of the cooling gas. Techniques used to follow graphite oxidation and fuel can fouling are described. A method for the elimination of fouling by oxygen injection and preferential oxidation of carbonous deposits is also described.

43790 **(IAE—3447/4) Preparation of the constant library in the NEKTAR-M program using the files of evaluated neutron data.** Gol'tsev, A.O. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702210.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.

A structure of the constant library, a new version of the NEKTAR program used to calculate physical characteristics of high-temperature gas-cooled reactors, is studied. Auxiliary programs designed for the preparation of information for this library from the evaluated neutron data files are described.

43791 **(Juel—1788) Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors.** Phlippen, P.W. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung; Technische Hochschule Aachen (Germany, F.R.)). Jul 1982. 116p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750917.

Thesis.

Owing to its spherical fuel elements the pebble bed high temperature reactor provides the possibility to remove these fuel elements rapidly from the reactor for the purpose of after-heat removal and cooling in situations of danger and to collect them in easily cooled tanks. The paper investigates and represents fields of problems such as critically behaviour of core and fuel element collecting tanks, emission time of the core, thermodynamics in the vessel etc. by example of the PNP-500 reactor concept. A selection for the construction proposal was made from the performance possibilities of the three necessary main components prestressed-concrete vessel closure, fuel element guide and fuel element storage with cooling system. The proposal includes a prestressed concrete vessel closure opening by hydraulics as well as three annular fuel element storage modules cooled with the containment air by natural convection.

43792 **(NIIAR—56(509)) Development of the installation for zirconium alloy corrosion testing in superheated steam flow in a reactor channel.** Aver'yanov, P.G.; Samsonov, B.V.; Seredkin, S.V.; Tsykanov, V.A.; Shulimov, V.N. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1981. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702130.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 3 figs.

The technological flowsheet of an installation for corrosion testing of structural materials in a reactor channel under conditions typical for the RBMK type reactors is described. The structural specific features of a capsule for zirconium alloy in-pile testing at superheated steam pressure of 2MPa and temperature upto 550 deg C are considered. The peculiarities of such capsule parameter calculation are discussed. On the base of the results of the installation performance testing in a reactor channel at power density of 1-1.5 W/g during 3500 h the conclusion on its high operational reliability is made.

2104 Power Reactors, Non-breeding, Otherwise Moderated Or Unmoderated

REFER ALSO TO CITATION(S) 43339, 43867, 43868

43793 (AECL—7606) Zircaloy behaviour in high temperature irradiated water. Urbanic, V.F. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Apr 1982. 28p. (CONF-8110258—1). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701807.

From IAEA conference on influence of power reactor water chemistry on fuel cladding reliability; San Miniato, Italy (12 Oct 1981).

The corrosion and hydriding of Zircaloy during irradiation in high temperature water is strongly dependent on the oxygen concentration of the water. Corrosion tests in the NRX and NRU research reactors using small samples have demonstrated the importance of water chemistry in maintaining Zircaloy corrosion and hydriding within acceptable limits. Zircaloy fuel cladding develops non-uniform, patch-type oxides during irradiation in hich temperature water containing dissolved oxygen. Results from examinations of prototype fuel cladding irradiated in the research reactors are presented to show how local variations in coolant flow, fast neutron flux, metallurgical structure and surface condition can influence the onset of non-uniform corrosion under these conditions. Destructive examinations of CANDU-PHW reactor fuel cladding have emphasized the importance of good chemistry control, especially the dissolved oxygen concentration of the water.

43794 (IAEA-R—2547-F) Non-destructive technique for qualitative and attribute verification of spent fuel elements. Final report for the period 1 May 1980 - 31 July 1982. Vana, N. (International Atomic Energy Agency, Vienna (Austria)). Aug 1982. 41p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701809.

Some results of spent fuel measurements at Halden HWR (Norway) are described. Three irradiated assemblies were measured by using solid state track records (SSTR), thermo luminescent detectors (TLD) and small ion (IC) and fission chambers (FC). The burn-up range was from 5 to 40 GWd/t, cooling time varied from approximately 3.5 months to 12 years. The gross gamma and neutron burn-up profiles, obtained by using the above mentioned techniques are identical. The exposure time for SSTR's varied from 10 to 50 minutes. One should note that SSTR's were quite sensitive and allowed the authors to observe an "enrichment" effect: at nearly the same burn-up values (approximately 37 GWd/t), the assembly with lower U-235 enrichment (5.08%) had higher neutron emission than the assembly with 8% e

43795 (INIS-mf—7666, pp vp) Calculation of the Kernel scattering for thermal neutrons in H_2O and D_2O. Leal, L.C.; de Assis, J.T. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A computer code, using the Nelkin-and Butler models for the calculations of the Kernel scattering, was developed. Calculations of the thermal neutron flux in an homogeneous-and infinite medium with a $1/v$ absorber in 30 energy groups were done and compared with experimental data. The reactors parameters calculated by the Hammer code (in the original version and with the new library generated by the authors' code) are presented.

2105 Power Reactors, Breeding

REFER ALSO TO CITATION(S) 43746, 43829, 43908, 43920, 43923, 43924, 43925, 43926, 43941, 43945, 44168, 44169, 44170, 44171

43796 (AECL—7688) Dynamic simulation of the 2 MWt slowpoke heating reactor. Tseng, C.M.; Lepp, R.M. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Apr 1982. 26p. (CONF-8204114—2). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701811.

From Simulation symposium on reactor dynamics and plant control; Mississauga, Canada (19 Apr 1982).

A 2 MWt SLOWPOKE reactor, intended for commercial space heating, is being developed at the Chalk River Nuclear Laboratories. A small-signal dynamic simulation of this reactor, without closed-loop control, was developed. Basic equations were used to describe the physical phenomena in each kf the eight reactor subsystems. These equations were then linearized about the normal operation conditions and rearranged in a dimensionless form for implementation. The overall simulation is non-linear. Slow transient responses (minutes to days) of the simulation to both reactivity and temperature perturbations were measured at full power. In all cases the system reached a new steady state in times varying from 12 h to 250 h. These results illustrate the benefits of the inherent negative reactivity feedback of this reactor concept. The addition of closed-loop control using core outlet temperature as the controlled variable to move a beryllium reflector is also examined.

43797 (ANL—83-3) Utility subroutine package used by Applied Physics Division export codes. Adams, C.H.; Derstine, K.L.; Henryson, H. II; Hosteny, R.P.; Toppel, B.J. (Argonne National Lab., IL (USA)). Apr 1983. Contract W-31-109-ENG-38. 156p. NTIS, PC A08/MF A01. Order Number DE83015740.

This report describes the current state of the utility subroutine package used with codes being developed by the staff of the Applied Physics Division. The package provides a variety of useful functions for BCD input processing, dynamic core-storage allocation and managemnt, binary I/0 and data manipulation. The routines were written to conform to coding standards which facilitate the exchange of programs between different computers.

43798 (ANL—83-43) Review of leakage-flow-induced vibrations of reactor components. Mulcahy, T.M. (Argonne National Lab., IL (USA)). May 1983. Contract W-31-109-ENG-38. 31p. NTIS, PC A03/MF A01. Order Number DE83015753.

The primary-coolant flow paths of a reactor system are usually subject to close scrutiny in a design review to identify potential flow-induced vibration sources. However, secondary-flow paths through narrow gaps in component supports, which parallel the primary-flow path, occasionally are the excitation source for significant vibrations even though the secondary-flow rates are orders of magnitude smaller than the primary-flow rate. These so-called leakage flow problems are reviewed here to identify design features and excitation sources that should be avoided. Also, design rules of thumb are formulated that can be employed to guide a design, but quantitative prediction of component response is found to require scale-model testing.

43799 (ANL—83-56) Leakage-flow-induced vibration of a tube-in-tube slip joint. Mulcahy, T.M. (Argonne National Lab., IL (USA)). Jun 1983. Contract W-31-109-ENG-38. 17p. NTIS, PC A02/MF A01. Order Number DE83015748.

The susceptibility of a cantilevered tube conveying water to self-excitation by leakage flow through a slip joint is assessed experimentally. The slip joint is formed by inserting a smaller, rigid tube into the free end of the cantilevered tube. Variations of the slip joint annular gaps and engagement lengths are tested, and several mechanisms for self-excitation are described.

43800 (CEA-CONF—6355) Fabrication of plutonium fuel for fast neutron reactors. Bailly, H. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France)). Jun 1982. 13p. (In French). (CONF-8206167—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701810.

From SFEN meeting; Paris, France (9 Jun 1982).

Properties of plutonium are first recalled, then the conditions of fabrication are exposed including criticality protection against contamination and irradiation. The three main steps of the process are examined: pellet fabrication, pin fabrication and fuel assembly mounting. Quality control, waste processing and evolution of the process are exposed.

43801 **(DOE/NE/37900—1) Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9.** Dobbs, D.R. (Auburn Univ., AL (USA). Dept. of Mechanical Engineering). 1982. Contract AS05-82NE37900. 32p. NTIS, PC A03/MF A01. Order Number DE83015652.

Portions are illegible in microfiche products.

Based on the data acquired in this study, the effects of austenitizing and tempering heat treatments on the impact energy of HT-9 can not be completely known or understood. The Charpy-impact transition temperature (ITT) was depressed 38°C by decreasing the austenitizing temperature from 1000°C to 900°C. However a decrease from 1100°C to 1050°C produces an increase in the ITT of 40°C. The lowest ITT was found to occur at -10°C. This condition was produced by an austenitization at 1100°C. An inverse relationship between grain size and ITT was found to exist in the range of grain sizes from 4 to 8. At a grain size of 3, the ITT was found to be -10°C and the inverse relationship is invalid. Further research is needed in the range of larger grain sizes.

43802 **(DOE/NE/37900—3) Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9.** Stone, M.A. (Auburn Univ., AL (USA). Dept. of Mechanical Engineering). 1983. Contract AS05-82NE37900. 49p. NTIS, PC A03/MF A01. Order Number DE83015655.

Portions are illegible in microfiche products.

The effects of austenitizing and tempering heat treatments on carbide precipitation in the alloy HT-9 have been investigated and documented. The study indicated that for specimens tempered at 650, 700, and 750°C the amount of carbide precipitation was independent of the austenitizing temperature. However, for specimens tempered at 800°C, the carbide precipitation varied as a function of austenitizing temperature. The maximum carbide precipitation for an 800°C temper treatment occurred at 1175°C austenitizing temperature. Carbide size at constant tempering temperature varied as a function of austenitizing temperature for all temper treatments. Samples austenitized at 1100°C and tempered at 650°C showed an unusually high carbide size in relation to other samples tempered at 650°C. Carbide size as a function of tempering temperature increased with increasing austenitizing temperature.

43803 **(FEI—1158) Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing.** Zhukov, A.V.; Matyukhin, N.M.; Rymkevich, K.S.; Sviridenko, E.Ya.; Ushakov, P.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1981. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702089.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 5 figs.; 1 tab.

The interchannel mixing of a coolant (eutectic alloy 22%Na+78% K) in rod assemblies spaced by wire windings alternating right and left windings is investigated. For measuring the distribution of coolant flow velocity components the electromagnetic method is used. This method permits to determine mass transfer from channel to channel, microstructure of the process and to study its physics. The investigation performed shows that the intensity of the inter-channel transfer in assemblies with differently oriented windings is twice higher than in assemblies with unidirectional windings. The dependence of mixing coefficients on the Reynolds number for different types of rod screw ribbing is approximately identical and can be described by the dependence for assemblies with unidirectional screw windings of the "rod-rib" type. The capacity required for coolant pumping at differently oriented rod ribbing is approximately (10-12)% loss than at unidirectional rod ribbing.

43804 (INIS-mf—7666, pp vp) **Comparative analysis of CARNAVAL II Library.** dos Santos Bastos, W. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The CARNAVAL II Cross Sections Library from the French fast reactor calculation system is evaluated in two ways: 1) a comparative analysis of the calculations system for fast reactors at IEN (Instituto de Engenharia Nuclear) using a 'benchmark' model is done; 2) a comparative analysis in relation to the French system itself is also done, using calculations realized with two versions of the French library: the SETR-II and the CARNAVAL IV, the first one being anterior and the second one posterior to the CARNAVAL II version, the one used by IEN.

43805 (INIS-mf—7666, pp vp) **Possible types of breeders with thorium cycle.** Ishiguro, Y.; de Gouveia, A.S. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

Neutronics calculations of simplified homogeneous reactor models show the possibility that metal-fueled LMFBRs and coated particle fueled gas cooled reactors achieve doubling times of around 10 years with the thorium cycle. Three concepts of gas-cooled thorium cycle breeders are discussed.

43806 (INIS-mf—7666, pp vp) **Sensitivity analysis of U^{238} cross sections in fast nuclear systems-SENSEAV-R computer code.** de Amorim, E.S.; D'Oliveira, A.B.; de Oliveira, E.C. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

For many performance parameters of reactors the tabulated ratio calculation/experiment indicate that some potential problems may exist either in the cross section data or in the calculation models used to investigate the critical experimental data. A first step toward drawing a more definite conclusion is to perform a selective analysis of sensitivity profiles and covariance data files for the cross section data used in the calculation. Many works in the current literature show that some of these uncertainties come from uncertainties in $^{238}U(n,\gamma)$, $^{239}U(n,f)$ $^{239}Pu(n,f)$. Perturbation methods were developed to analyze the effects of finite changes in a large number of cross sections and summarize the investigation by a group dependent sensitivity coefficient. As an application, the results of this investigation indicates that improvements should be done only on the medium and low energy ranges of $^{238}U(n,\gamma)$ based on an analysis of cost and economic benefits.

43807 (INIS-mf—7666, pp vp) **Calculation of integral parameters sensitivity in fast reactors.** Renke, C.A.C. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The variational formulation, incorporated to VARI-1D computer code is used the sensitivity calculations. At a first stage the direct method was also used with the objective of establishing a parallel between the two methods.

43808 **(KFK—3253) Impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle.** Marten, K.; Baumgaertner, E.; Khan, M.; Hoffmann, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter). Sep 1982. 41p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750206.

The impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle was studied in two types of experiments: The gas fraction of the subchannels as well as the gas bubble spectra across the outlet of an unheated 61-rod bundle with wire spacers were measured in water/air flow. For uniform and non-uniform gas distribution at the bundle inlet, the determined averaged gas fractions across the subchannels at the bundle outlet were uniform and non-uniform, respectively. The measured bubble spectra show a dependency between the bubble frequencies, the contact times and the gas fractions of a subchannel. A model to compute

the transient temperature distributions within a heated rod was supported by experiments in a sodium/argon slug flow. The measurements show that the fluid and the rod temperature variations increase with increasing heat flux, gas fraction and contact time of a single bubble at the wall.

43809 (KFK—3256) Irradiation experiment Mol-7B. Kummerer, K.; Weimar, P. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter). Sep 1982. 170p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750209.

Within the fuel pin development for fast breeder reactors the irradiation experiment Mol-7B comprised the irradiation of a fuel pin bundle with 18 pins in the epithermal neutron flux of the Belgian reactor BR 2. The bundle was loaded in the sodium circuit in the central channel of the BR 2, the so-called IPSL-Loop. The pins contained UO_2-PuO_2 fuel in a stainless steel cladding. The design of the pins with respect to material composition and geometry were representative for the conditions in a fast breeder prototype like the SNR 300. Having a PuO_2-content of about 30 w/o, the smeared density of the fuel was 80% of theoretical density. The claddings consisted of two different types of high temperature resistant stainless steels. The pin diameter was 6.0 mm. The operational conditions during irradiation were designed to be 450 watts/cm for the linear rod power and almost 700°C for the maximum cladding midwall temperature. In the course of the experiment the power happened to be remarkably higher, up to about 590 watts/cm. The target burnup was overdrawn up to 125,000 MWd/t M. After reaching about the half of this burnup the first pin failure in the bundle was revealed by fission gas signals. Nevertheless it was decided to run the experiment beyond breach up to the full irradiation time of 384 days. This report is a documentation of this irradiation experiment, where all data and facts on the experimental objectives, pin design, specifications for pin and bundle, fabrication of the pins including preirradiational tests, the irradiation history, and the destructive and nondestructive post irradiation examination are compiled. Finally an evaluation of the experiment is given and possible reasons for pin failures are discussed.

43810 (KFK—3283) Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures. Gibs, V. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter). Oct 1982. 172p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750208.

Diss. submitted to Karlsruhe Univ. (TH) (Germany, F.R.).

The influence of well-defined halogen potentials (of Cr-, Fe-, Ni-, Cu-halides), chalcogens, and mixtures with CuO/Cu on the creep behavior of fuel pin cladding materials was investigated with respect to the conditions in fast breeder reactors. The experiments were carried out on flat and tube specimens, especially of the austenitic Cr-Ni-steel X10CrNiMoTiB1515 (1.4970), at 500°C and 700°C according to the temperature range in the reactor. The tensile or pressure load was chosen to reach certain life-times of the reference specimens (100 h-500 h). Also with the tube specimens mainly tensile creep tests were performed to examine the influence of a definite chemical system in the interior of the tube specimen on the creep behavior. To analyze the creep behavior the usual evaluation of the time to rupture total elongation and secondary creep rate was refined by evaluating also the elongation at the beginning of the tertiary creep phase and the elongation, at which the tertiary creep curve is bending.

43811 (KFK—3325, pp 1-35) Present state of the URANUS code. Preusser, T. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

The URANUS fuel rod computer code is documented in detail. Special attention is paid to the fundamental structure of the code, the different versions and makes data variants and typical results of compilations.

43812 (NIIAR—58(511)) Metrology installation for studies of the accuracy of correlation methods for sodium flow rate measurements. Adamovskij, L.A.; Golovanov, V.V.; Kebadze, B.V.; Afanas'ev, V.A. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1981. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702154.

9 refs.; 4 figs.; 2 tabs.

For carrying out the studies on accuracy of correlation methods for sodium coolant flow rate measurement the metrology installation has been designed and created for the 2-20 m^3/h flow rate range at the sodium temperature up to 320 deg C. The procedure for the installation metrology certification and the technique for calculation of a maximum flow rate measurement error taking into account the basic sources of systematic and random measurement error are described. The installation is certified by the state standard authorities for maximum unit measurement error <0.9% and acceptable for operation as a model installation.

43813 (PNL-SA—9928) Probabilistic analysis of alternative strategies for US FBR development. Burnham, J.B.; Boegel, A.J.; White, M.K.; Fraley, D.W. (Pacific Northwest Lab., Richland, WA (USA)). 1982. Contract AC06-76RL01830. 4p. (CONF-820420—14). NTIS, PC A02/MF A01. Order Number DE83014642.

From International ENS/ANS conference on nuclear energy with emphasis on fuel cycles; Brussels, Belgium (26 Apr 1982).

A high degree of uncertainty characterizes the major factors that influence the selection of an approach and the timing for developing a Fast Breeder Reactor (FBR) technology. Because an FBR development program necessarily involves the construction of a sequence of large power plants over many years, the duration and cost of the program are highly uncertain. Likewise, estimates of when FBR technology will be competitive with other central station power plant options are also uncertain. Because of these planning uncertainties, it is not possible to structure, with complete confidence, a development program that provides a mature technology exactly when economic forces establish market demand. Despite these uncertainties, near-term decisions regarding the nature and pace of the FBR development program must be made. This paper summarizes a study performed to provide the US Department of Energy (DOE) with information that can be used to make programmatic decisions.

43814 (UJV—6143-T) Heat transfer in peripheral region of fast reactor fuel assembly. Part 2. Experimental study of temperature fields in fuel assembly side region at rated rod position. Sulc, V.; Masek, V.; Gregor, M.; Nechvatal, L. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). [nd]. 74p. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83702155.

A theoretical analysis is presented of thermal, geometrical, and hydrodynamic conditions in the peripheral region of the fuel assembly of a BN-600 type fast reactor. The basic relations and the mathematical formulation are given of heat transfer and of temperature fields for the rated position of fuel rods. The measurement of heat transfer and temperature conditions was effected using experimental loop S III. The methodology of the measurements, the processing of the results and the evaluation of the experiments are described. Empirical equations are presented for temperature nonhomogeneities in the region under study.

43815 (UJV—6144-T) Heat transfer in peripheral region of fast reactor fuel assembly. Part 3. Experimental study of temperature fields in fuel assembly side region at non-rated rod position. Sulc, V.; Masek, V.; Gregor, M.; Nechvatal, L. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jul 1982. 65p. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83702156.

The results are presented of measuring temperature fields in the fuel assembly of a BN-600 type fast reactor. The design and specifications of the experimental sodium loop and the methodology for temperature field measurement are described. Different cases were studied of the disturbance of the fuel rods configuration, viz.: the contact of a side rod with the assembly wall; a distance of 0.12

mm from the assembly wall; a contact with two adjacent rods in an infinite lattice. Empirical relationships were found for the calculation of temperature nonhomogeneities in the fuel assembly.

43816 **(UJV—6145-T) Heat transfer in peripheral region of fast reactor fuel assembly. Part 4. Temperature conditions in fuel assembly with inserts in marginal cells.** Sulc, V. (Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)). Jul 1982. 80p. (In Russian). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83702157.

For part 3 see UJV–6144-T.

The results are presented of an experimental study of temperature fields in the marginal region of the fuel assembly of a fast reactor of the BN-600 type using inserts in side cells. The following cases were studied: 1. the fuel element in nominal position, 2. the fuel element in contact with two other elements of the infinite lattice. Suitable inserts in the marginal region of the fuel assembly reduce the unevenness of temperature distribution in the fuel assembly cross section by 40 to 60% in dependence on the value of Peclet number. The processed results were generalized in empirical formulas for computing the distribution of temperature for the values Pe=20 to 600.

43817 **(ZPR-TM—444) Recent developments in the central worth discrepancy.** Smith, K.S.; Schaefer, R.W. (Argonne National Lab., IL (USA)). 23 Jun 1983. Contract W-31-109-ENG-38. 37p. NTIS, PC A03/MF A01. Order Number DE83014537.

Portions are illegible in microfiche products.

Results of recent fissile small-sample worth experiments in three fast reactor diagnostic critical assemblies are presented. These experiments produced significant insight into heterogeneity-related errors in standard calculational models of worth experiments in plate-type critical assemblies. Results of improved techniques for calculation of worth experiments are presented, and the mean ratios of calculated to experimental (C/E) worths in the three new benchmark critical assemblies are shown to be in the range of 0.97 to 1.04. The implications of the improved understanding of small-sample worth experiments with respect to previously-reported critical experiments are discussed.

2106 Power Reactors, Auxiliary, Mobile, Package, And Transportable

43818 **(BNL—33058) FBR and RBR particle bed space reactors.** Powell, J.R.; Botts, T.E. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 8p. (CONF-830812—37). NTIS, PC A02/MF A01. Order Number DE83015051.

From 18. intersociety energy conversion engineering conference; Orlando, FL, USA (21 Aug 1983).

Portions are illegible in microfiche products.

Compact, high-performance nuclear reactor designs based on High-Temperature Gas Reactors (HTGRs) particulate fuel are investigated. The large surface area available with the small-diameter (~ 500 microns) particulate fuel allows very high power densities (MW's/liter), small temperature differences between fuel and coolant (~ 10°K), high coolant-outlet temperatures (1500 to 3000°K, depending on design), and fast reactor startup (~ 2 to 3 seconds). Two reactor concepts are developed - the Fixed Bed Reactor (FBR), where the fuel particles are packed into a thin annular bed between two porous cylindrical drums, and the Rotating Bed Reactor (RBR), where the fuel particles are held inside a cold rotating (typically ~ 500 rpm) porous cylindrical drum. The FBR can operate steady-state in the closed-cycle He-cooled mode or in the open-cycle H_2-cooled mode. The RBR will operate only in the open-cycle H_2-cooled mode.

43819 **(GA—A16992) SP-100 coated-particle fuel development. Phase I. Final report.** (GA Technologies, Inc., San Diego, CA (USA)). Mar 1983. Contract AT03-82SF11690. 118p. NTIS, PC A06/MF A01. Order Number DE83015293.

This document is the final report of Phase I of the SP-100 Coated-Particle Fuel Development Program conducted by GA Technologies Inc. for the US Department of Energy under contract DE-AT03-82SF11690. The general objective of the study conducted between September and December 1982 was to evaluate coated-particle type fuel as an alternate or backup fuel to the UO_2 tile-and-fin arrangement currently incorporated into the reference design of the SP-100 reactor core. This report presents and discusses the following topics in the order listed: the need for an alternative fuel for the SP-100 nuclear reactor; an abbreviated description of the reference and coated-particle fuel module concepts; the bases and results of the study and analysis leading to the preliminary design of a coated particle suitable for the SP-100 space power reactor; incorporation of the fuel particles into compacts and heat-pipe-cooled modules; initial efforts and plans to fabricate coated-particle fuel and fuel compacts; the design and performance of the proposed alternative core relative that of the reference fuel; and a summary of critical issues and conclusions consistent with the level of effort and duration of the study.

2107 Regulation And Licensing

REFER ALSO TO CITATION(S) 43933, 43940, 43953, 43958, 43959

43820 **(EGG—M-11983) Qualification of automated techniques for meeting ASME code and NRC requirements.** Cook, J.F. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 4p. (CONF-830652—3). NTIS, PC A02/MF A01. Order Number DE83015441.

From Automated non destructive evaluation conference; Idaho Falls, ID, USA (28 Jun 1983).

Nondestructive examinations for nuclear power plants must meet Volume 10, Part 50, Code of Federal Regulation requirements. For Inservice Inspection examinations, these regulations implement the rules of Section XI of the American Society for Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code). Since many of the ASME Code nondestructive examination rules were developed from manual examination practices, they may not apply to automated examinations. Alternate procedures are allowable through use of Code Cases, Nuclear Regulatory Commission Relief Requests, or ASME Code, Section XI, Paragraph IWA-2240 alternative examinations. Documentation of qualification test results for automated techniques is a necessary prerequisite for obtaining approval of alternate procedures. New Code rules are now being developed which will emphasize procedure qualification rather than detailed technique requirements. These qualification requirements should provide more incentive for adopting automated techniques with demonstrated procedure effectiveness.

43821 **(NUREG—0040-Vol.7-No.2) Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983.** (Nuclear Regulatory Commission, Arlington, TX (USA). Region IV). Jul 1983. 273p. NTIS, PC A12/MF A01 - GPO. Order Number DE83902874.

A fundamental premise of the Nuclear Regulatory Commission's (NRC) nuclear facility licensing and inspection program is that a licensee is responsible for the proper construction and safe operation of nuclear power plants. The total government-industry system for the inspection of nuclear facilities has been designed to provide for multiple levels of inspection and verification. Licensees, contractors, and vendors each participate in a quality verification process in accordance with requirements prescribed by, or consistent with, NRC rules and regulations. The NRC inspects to determine whether its requirements are being met by a licensee and his contractors, while the great bulk of the inspection activity is performed by the industry within the framework of sequential ongoing quality verification programs. The White Book contains information normally used to establish a qualified suppliers list; however, the information contained in this document is not adequate nor is it intended to stand by itself as a basis for qualification of suppliers.

43822 **(NUREG—0485-Vol.5-No.6) Systematic Evaluation Program. Status summary report.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management). 30 Jun 1983. 72p. NTIS, PC A04/MF A01 - GPO. Order Number DE83902882.

Portions are illegible in microfiche products.

Progress on the systematic evaluation program is presented concerning Big Rock Point reactor, Dresden-1 reactor, Dresden-2 reactor, Ginna-1 reactor, Connecticut Yankee reactor, LACBWR reactor, Millstone-1 reactor, Oyster Creek-1 reactor, Palisades-1 reactor, San Onofre-1 reactor, and Rowe Yankee reactor.

43823 **(NUREG—0580-Vol.12-No.6) Regulatory licensing status summary report. Nuclear power plants data for decisions (Blue Book), June 1-June 30, 1983.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management). Jul 1983. 63p. NTIS, PC A04/MF A01 - GPO. Order Number DE83902870.

This management report, Regulatory Licensing Status Summary Report, is designed to provide the necessary information for controlling the progress of review processes for central station nuclear reactor applications. Section I of this edition consists of the three summary of accomplishments, the new application forecast for OL's and CP's, and an abbreviation key. Section II represents the main body of the report and consists of the facility information. All OL's are listed first, followed by CP's, standard design reviews, other reviews, and finally, a non-power reactor summary. Each project consists of general facility data, current status for all phases of the review, and targeted and actual completion dates for key milestones in the review.

43824 **(NUREG—0750-Vol.16-No.3) Nuclear Regulatory Commission Issuances. Volume 16, No. 3.** (Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control). Sep 1982. 369p. NTIS, PC A16/MF A01 - GPO. Order Number DE83902872.

This report includes the issuances received during the specified period from the Commission (CLI), the Atomic Safety and Licensing Appeal Boards (ALAB), the Atomic Safety and Licensing Boards (LBP), the Administrative Law Judge (ALJ), the Directors' Decisions (DD), and the Denials of Petitions For Rulemaking (DPRM).

43825 **(ORAU/IEA—83-5(M)) Prospects and opportunities for nuclear power regulatory reform.** Barkenbus, J.N. (Oak Ridge Associated Universities, Inc., TN (USA)). Apr 1983. Contract AC05-76OR00033. 90p. NTIS, PC A05/MF A01. Order Number DE83014932.

This study seeks to portray the current nuclear regulatory system in historical, political, and comparative (international) contexts. Key structural and political factors that strongly influence the nature of the regulatory mode include a highly open and participatory decision-making structure, a Congress deeply divided over the merits of nuclear power (reflecting the public division), an active court system, and a fragmented nuclear/electric industry. Given these realities, one cannot expect an overnight change in the prescriptive regulatory practices of the Nuclear Regulatory Commission (NRC). There are steps, however, that can be taken to make nuclear regulation both more efficient and effective. These steps are described.

43826 **Using event trees to quantify the effect of post-TMI modifications on PORV-related LOCA probability.** Wood, D.C. (Westinghouse Electric Corp., Pittsburgh, PA). pp 1141-1150 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Limited use of probabilistic risk assessment technology has begun in the licensing process of nuclear power facilities. A recent NRC requirement from the TMI Action Plan requires that each licensee perform a probabilistic analysis, calculating the probability of a small break LOCA caused by a stuck-open PORV and evaluating the improvement from actions taken to reduce the probability. Westinghouse, in performing a Westinghouse-generic analysis, has used the event tree methodology to structure related LOCA, before and after the plant changes. The analytical approach, the use of probabilistic data and the results of the study are discussed in the paper.

2108 Economics

REFER ALSO TO CITATION(S) 43260, 43805

43827 **(DOE/NE—0051) Energy Economic Data Base Program (EEDB). Phase V update (1982) report.** (United Engineers and Constructors, Inc., Philadelphia, PA (USA)). Jul 1983. Contract W-31-109-ENG-38. 431p. NTIS, PC A19/MF A01. Order Number DE83015423.

This Phase V Update of the Energy Economic Data Base (EEDB) is the latest in a series of cost studies dating back to the late 1960's that have provided the Department of Energy and its predecessor agencies with consistent data on the capital costs of reactor systems of current interest to the Nuclear Energy program and on the comparative costs of large fossil-fueled systems. This report summarizes the detailed data from the EEDB at an intermediate level and summarizes what has been learned from this year's Update. This report also contains fuel cycle and O and M cost data, but the emphasis of the program and the report is on capital costs. The DOE Office of Nuclear Energy summarizes the capital cost data as well as additional fuel cycle and O and M cost data in a separate report, Nuclear Energy Cost Data Base - A Reference Data Base for Nuclear and Coal-Fired Powerplant Power Generation Cost Analysis, DOE/NE-0044.

43828 **(DOE/NE—0052) Program reference book for the Energy Economic Data Base Program (EEDB).** Allen, R.E.; Brown, P.E.; Hodson, J.S.; Kaminski, R.S.; Ziegler, E.J. (United Engineers and Constructors, Inc., Philadelphia, PA (USA)). Jul 1983. Contract W-31-109-ENG-38. 404p. NTIS, PC A18/MF A01. Order Number DE83015326.

Portions are illegible in microfiche products.

The objective of the Energy Economic Data Base (EEDB) Program is to provide periodic updates of technical and cost (capital, fuel and operating and maintenance) information for nuclear and comparison electric power generating stations that is of significance to the US Department of Energy (USDOE). The purpose of this Reference Book is to provide the historical content of the EEDB through the Fourth Update (1981). It contains important descriptive and tutorial information concerning the structure and use of the EEDB. It also contains reports of work done to support various aspects of the first four updates, together with significant reference data developed during those updates. As a convenience to the user, it is intended that the Reference Book be sufficiently stable that revisions are required no more frequently than once every five years.

43829 **(DOE/SR/00952—T5) Nuclear-fuel-cycle education: Module 5. In-core fuel management.** Levine, S.H. (Kansas State Univ., Manhattan (USA); Pennsylvania State Univ., University Park (USA)). Jul 1980. Contract AS09-76SR00952. 459p. NTIS, PC A20/MF A01. Order Number DE83015146.

Portions are illegible in microfiche products.

The purpose of this project was to develop a series of educational modules for use in nuclear-fuel-cycle education. These modules are designed for use in a traditional classroom setting by lectures or in a self-paced, personalized system of instruction. This module on in-core fuel management contains information on computational methods and theory; in-core fuel management using the Virginia Polytechnic Institute and State University computer modules; pressurized water reactor in-core fuel management; boiling water reactor in-core fuel management; and in-core fuel management for gas-cooled and fast reactors.

43830 **(DOE/SR/00952—T10) Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report.** Brehm, R.; Reynolds, R.S. (Arizona Univ., Tucson (USA); Mississippi State Univ., Mississippi State (USA); Kansas State Univ., Manhattan (USA)). Dec 1981. Contract AS09-76SR00952. 133p. NTIS, PC A07/MF A01. Order Number DE83015542.

Portions are illegible in microfiche products.

This educational module covers nuclear-fuel-cycle economics and net energy analysis of nuclear power systems. The econonmics portion covers engineering economic principles and engineering economic analysis of capitalized projects. The net energy analysis covers the general concept, input-output modeling principles, energy language and model structure, environmental energy costs, the net energy analysis model, the nuclear fuel cycle, and the application of net energy analysis to BWR and PWR type reactors.

43831 **(NUCLEBRAS-CDTN—441/82) KFA/NUCLEBRAS R + D program on Th utilization in PWR.** Pinheiro, R.B.; Andrade, E.P.; Cardoso, P.E.; Maly, V.; Doerr, W.; Wehner, E. (Centro de Desenvolvimento da Tecnologia Nuclear, Belo Horizonte (Brazil)). Jul 1982. 12p. (CONF-820420—13). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702150.

From International ENS/ANS conference on nuclear energy with emphasis on fuel cycles; Brussels, Belgium (26 Apr 1982).

The R + D program of KFA and NUCLEBRAS, with participation of KWU and NUKEN in Germany side, for the thorium utilization in nuclear reactors, is described.

2109 Process Heat Reactors

REFER ALSO TO CITATION(S) 43909, 43922

43832 **(AECL—7086) AECL programs for new applications for nuclear energy.** Robertson, J.A.L. (ed.). (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). May 1982. 46p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701833.

This document reports the activities of the New Applications Steering Committee (NASC) of Atomic Energy of Canada Ltd. The NASC is intended to develop future RβD programs, and more specifically to promote certain existing ideas that have not yet become part of established programs, stimulate new idaas, identify needs and opportunities for RβD, evaluate proposals for RβD programs, initiate action on new ideas, and provide feedback to a staff who may be expected to generate ideas. Major areas and technologies that have been studied by the NASC and are covered in this report include oil substitution by nuclear heat and by electricity, energy storage and the role of hydrogen, nuclear energy in liquid fuel production, assessment of Canadian energy resources, and computer modelling of energy systems.

43833 **(GEFR—00622) 60-MW/sub t/ methanation plant design for HTGR process heat.** Davis, C.R.; Arcilla, N.T.; Hui, M.M.; Hutchins, B.A. (General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.). Jul 1982. Contract AC03-80ET34034. 114p. NTIS, PC A06/MF A01. Order Number DE83015313.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report describes a 60 MW(t) Methanation Plant for generating steam for industrial applications. The plant consists of four 15 MW(t) methanation trains. Each train is connected to a pipeline and receives synthesis gas (syngas) from a High Temperature Gas-Cooled Reactor Reforming (HTGR-R) plant. Conversion of the syngas to methane and water releases exothermic heat which is used to generate steam. Syngas is received at the Methanation Plant at a temperature of 80°F and 900 psia. One adiabatic catalytic reactor and one isothermal catalytic reactor, in each methanation train, converts the syngas to 92.2% (dry bases) methane. Methane and condensate are returned at temperatures of 100 to 125°F and at pressures of 860 to 870 psia to the HTGR-R plant for the reproduction of syngas.

22 NUCLEAR REACTOR TECHNOLOGY

43834 **(NP—3902382) Swiss Federal Institute for Reactor Research. 1981 annual report.** (Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)). [nd]. 89p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83902382.

Portions are illegible in microfiche products.

Information is given on the administrative and structural organization of the Institute, a description of the principal divisions, reports on developmental and research projects, including high temperature reactor, breeder reactors, and Proteus experiments, environmental and safety studies, solar and nuclear energy systems, personnel, construction plans, library facilities, financial reports, and publications of Institute-sponsored research.

43835 **(NP—3902383) Julich Nuclear Researh Institute annual report, 1980/81.** Weinhold, S.A. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)). 1981. 172p. (In German). Kernforschungsanlage Julich GmbH, Postfach 1913, 5170 Juelich, Germany.

Information is given on the Institute's research and project planning activities including studies on high temperature reactors, safety, risk factor analysis, ceramic heat exchangers, solar energy, nuclear fusion, organization, technical infrastructure, and radioactive waste disposal studies.

2201 Theory And Calculation

REFER ALSO TO CITATION(S) 43797, 43806, 43807, 43928, 43965

43836 **(BNL—33149) Accelerator breeder with uranium, thorium target.** Takahashi, H.; Powell, J.; Kouts, H. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 20p. (CONF-830632—7). NTIS, PC A02/MF A01. Order Number DE83015149.

From 3. international conference on emerging nuclear energy systems; Helsinki, Finland (6 Jun 1983).

An accelerator breeder, that uses a low-enriched fuel as the target material, can produce substantial amounts of fissile material and electric power. A study of H_2O- and D_2O-cooled, UO_2, U, (depleted U), or thorium indicates that U-metal fuel produces a good fissile production rate and electrical power of about 60% higher than UO_2 fuel. Thorium fuel has the same order of magnitude as UO_2 fuel for fissile-fuel production, but the generating electric power is substantially lower than in a UO_2 reactor. Enriched UO_2 fuel increases the generating electric power but not the fissile-material production rate. The Na-cooled breeder target has many advantages over the H_2O-cooled breeder target.

43837 **(CEA-CONF—6455) Decay heat calculations with the CEA radioactivity data bank and the code PEPIN.** Duchemin, B.; Nimal, B.; Nimal, J.C.; Veillaut, J.P.; Blachot, J. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France); CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)). Sep 1982. 8p. (In French). (CONF-820942—28). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702131.

From Nuclear data for science and technology international conference; Antwerp, Belgium (6 Sep 1982).

The CEA radioactivity data bank, has been updated mainly from ENSDF and from some recent experimental results. This library contains the decay data for about 700 fission products (F.P.), 220 actinides and more than 1400 other nuclides. A comparison between our data and ENDF/B5 is shown for the fission products. The fission products part of this library is currently used for shielding and decay heat calculations with the PEPIN code. Calculations and spectral comparisons of the available experiments (Dickens, Lott, Yarmell ...) and other recent calculations is made for thermal fission of ^{235}U and ^{239}Pu using our data bank as input.

43838 **(CEA-R—5182) Scattering anisotropy and neutron leakage in a reactor lattice.** Yang, Chuande; Benoist, Pierre. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 81p. (In French). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83702132.

Scattering anisotropy is often taken into account, in an isotropic formalism by a transport correction. This correction which, even in a homogeneous medium, is known to be false in multigroup theory, is always incorrect for the calculation of neutron leakages in a lattice. The method presented here allows to calculate the diffusion coefficients in a Wigner-Seitz cell, at the zeroth order in

powers of the buckling, for a linearly anisotropic scattering law; it allows to test the degree of approximation of the transport correction in various types of lattices. This correction appears to be a good approximation as far as the radial diffusion coefficient is concerned, but it may strongly underestimate the axial coefficient in certain types of lattices. The method allows to study the problems of correlation between groups which appear in the calculation of diffusion coefficients.

43839 **(FEI—1254) Technique and computer code for calculating the isotope composition change in one-dimensional homogeneous reactor.** Glebov, A.P.; Kalashnikov, A.G.; Lislitsyna, T.S.; Moseev, A.L.; Seliverstov, I.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702133.

8 refs.

The technique and KODRA computer code used for calculating homogeneous reactor core isotope composition change with fuel burnup are described. The calculation of changes in the neutron efficient multiplication factor, energy release and neutron flux spatial distributions, poisoning by ^{135}Xe in different states, concentrations of different radioisotopes and other physical characteristics which are necessary in the process of reactor design and operation is provided in the code. A possibility is for simulating approximately reactor control system elements by annular absorbing zones with cross sections changing with burnup. Calculation of neutron fluxes at each time step is carried out for the ranges of slowing-down (20 groups) and thermalization (17 groups). The possibility of calculating few-group macroconstants for using them in codes for two- and three-dimensional reactor calculations is provided. The code is written in the FORTRAN language and adapted to the BESM-6 computer witb the DISPAK operational system.

43840 **(FEI—1294) Energy yield calculation constant preparation in the ARAMAKO system.** Savos'kin, M.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702135.

Microfiche only, copy does not permit paper copy reproduction refs.; 1 tab.

The algorithm of preparation of energy yield calculation constants in the ARAMAKO system by data of the 26-group neutron field calculation is given. The reference to the constant preparation module and necessary requirements are described.

43841 **(IAE—3404/5) Technique and the DAR and FINDIF codes for one-dimensional calculation of reactor cells with opportunity of account for discontinuous boundary conditions.** Glushkov, E.S.; Petushkova, N.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 35p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702136.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 3 tabs.

The description of the technique and DAR and FINDIF codes for one-dimensional nuclear reactor (cells) calculation in the diffusion approximation for plane, cylindrical and spherical configurations with the pre-set group constants (number of groups no more than four) is presented. In the DAR code the method of solution of one-dimensional multigroup reactor equations based on analytical solution of the diffusion type equations with the known right part is applied. The FINDIF code is based on the finite difference method. Finite-difference equations are solved by the factorization method. The method of the right run is used. Possibility of calculations with discontinuous boundary conditions is envisaged. The effective method for solving the system of linear algebraic equations with a four-diagonal matrix is presented. The DAR and FINDIF codes are written in the FORTRAN language for the BESM-6 computer.

43842 **(INDC(YUG)—7) Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries.** Trkov, A.; Budnar, M.; Copic, M.; Perdan, A.; Ravnik, M. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Jan 1982. 32p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702137.

Multigroup constants for 1-H-1, 92-U-235, and 92-U-238 have been calculated. Averaged cross-sections and other constants have been prepared in the WIMS 69-group format. Comparison has been made between group constants obtained with several evaluated libraries (KEDAK-3 1975, 1979, ENDF/B-4, ENDF/B-5) and the WIMS-D library. Observed differences are most pronounced in the resonance and fast region. From test runs on fue cell with the WIMS program it can be deduced that these differences affect the fewgroup constants significantly.

43843 **(INIS-mf—7666) 2. national meeting of reactor physics.** (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. 352p. (In Portuguese). (CONF-8104185—). NTIS (US Sales Only), PC A16/MF A01. Order Number DE83780890.

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The papers presented at II Meeting on Reactor Physics, are present. These papers are about Reactor Physics and Accident Analysis in Nuclear Power Plant.

43844 (INIS-mf—7666, pp vp) **Calculation of critical parameters in uranium mixtures.** Spiegelberg, R.deS.H.; Lederman, L.; Vellozo, S.O. (Instituto Militar de Engenharia, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

Critical parameters were calculated using the one-dimensional multigroup transport theory. Calculations have been perfomed for water mixture of uranium metal and uranium oxides. The results of the calculations were plotted showing critical parameters (critical-massor radius). The critical values obtained in 'Handbuch Zur Kritikalitat' were used to compare with critical parameters. A sensitivity study for the influence of the space mesh size, multigroup structure and order of the Sn aproximation on the critical radius was carried out. The Gamtec-II code and DTF-IV were used.

43845 (INIS-mf—7666, pp vp) **Solution of two energy-group neutron diffusion equation by triangular elements.** Correia Filho, A. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The application of the triangular finite elements of first order in the solution of two energy-group neutron diffusion equation in steady-state conditions is described. The EFTDN (triangular finite elements in neutrons diffusion) computer code in FORTRAN IV language is developed. The discrete formulation of the diffusion equation is obtained applying the Galerkin method. The power method is used to solve the eigenvalues' problem and the convergence is accelerated through the use of Chebshev polynomials. For the equation systems solution the Gauss method is applied. The results of the analysis of two test-problems are presented.

43846 (INIS-mf—7666, pp vp) **Calculation of the thermal disadvantage factor for a reactor cell with anisotropic scattering by the Fn method.** Maiorino, J.R. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Engenharia Nuclear). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The F sub(N) method is used for the calculation of the thermal disadvantage factor in reactor cells with anisotropic scattering

in the moderator. Numerical results were obtained for several reactor cells and compared with the results obtained by other methods. The results confirmed the physical conclusion, that the higher order terms in the expansion of the scattering law have an insignificant effect on the thermal disadvantage factor.

43847 (INIS-mf—7666, pp vp) **Synthesis method with finite elements for diffusion calculations.** da Silva, C.F. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The possibility of utilization of the finite element method and the synthesis method combined, for the solution of the 2D multigroup diffusion problem is discussed.

43848 **(Juel—1808) Migration behaviour of fission products in and from spherical HTR fuel elements (SAPHIR loop experiments in the PEGASE reactor).** Fukuda, K.; Groos, E.; Rau, J. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen). Sep 1982. 58p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750914.

The diffusion behaviour of some metallic fission products was evaluated for the irradiation experiments SAPHIR 4-10 and 11 performed by KFA Juelich in the PEGASE reactor, Cadarache (France). Diffusion coefficients for cesium in PyC coatings and for cesium and silver in graphitic fuel element matrix were obtained by analysing the fission product concentration profiles. The reason for the observed different diffusion behaviour of Cs 134 and Cs 137 is discussed as well as that for elevated concentrations of cesium, silver, and ruthenium near the fuel element surface. A simple model for assessing the trapping of metals in a graphite matrix is introduced. Release from the fuel element surfaces into the surrounding gas was found to be governed by direct recoil at low temperatures.

43849 **(KFK—3449) Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis.** Goel, B.; Fischer, U. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter; Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung). Feb 1983. 24p. (CONF-820942—35). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750924.

From Nuclear data for science and technology international conference; Antwerp, Belgium (6 Sep 1982).

An optimal solution of problems relating to the fission reactor fuel cycle requires the ability to calculate the isotope production as a function of reactor history. For this purpose neutron cross section data for ^{241}Am, sup(242m)Am, ^{243}Am and ^{244}Cm were evaluated for the German nuclear data library KEDAK-4. For some isotopes a large discrepancy between the resonance integrals and the effective thermal cross sections calculated from KEDAK and measurements in a reactor spectrum was observed. In an earlier report the discrepant thermal data were analysed. In this report the results of resonance integral measurements and of post irradiation analysis are critically examined and compared with those obtained from KEDAK-4 data. Good agreement between the calculations and reliable experimental data is observed.

43850 **(NIIAR—13(528)) Method for calculating the lifetime of a heterogeneous reactor with regular lattice of reactor control system elements.** Polivanov, I.F.; Starkov, V.A.; Yudin, K.I.; Makin, R.S. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1982. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702138.

7 refs.; 3 figs.; 5 tabs.

The method, algorithm and PRAKGER computer code complex used for calculating the lifetime of a heterogeneous reactor core with regular lattice of control elements are described. The method is based on the effective homogenization of a heterogeneous reactor core at each step of time integration. Isotope ratio for a cell in the process of burnup is calculated using an assumption that the neutron spectrum profile for this particular step of integration does not change. The method gives an opportunity of taking into account the power density redistribution in the process of reactor operation in details. In contrast to the majority of existing methods (besides the discrete one) the realized method helps to avoid solution of a nonstationary transport problem. The assumptions used in the method give an opportunity to make calculations for large time intervals (2000-5000 h) without an accuracy decrease. As compared with the discrete method the considered algorithm provides the calculational time decrease in 3-7 times. The results of test calculations for the ARBUS reactor obtained using the PRAKGER code complex coincide with the results of measurements made at the reactor in the limits of measuring errors.

43851 **(NIIAR—53(506)) Spectral analysis of some problems for neutron thermalization.** Makin, R.S. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1981. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702139.

Portions are illegible in microfiche products4 refs.

On the basis of a homogeneous integral equation a spectral analysis of a problem on a slow neutron energy spectrum in an infinite medium has been performed. Basicity conditions of the eigenfunctions system for a series of the initial problem approximations which can be recorded in a form of differential operators are obtained. For the general case a completeness of a part of the eigen-and- joined vectors has been estimated. Application of the spectral method (eigen functions method) to the solution of number of neutron thermalization problems is substantiated. Possible generalizations of the obtained results for these problems with account for fission and in inhomogeneous media are pointed out.

43852 **(ZJE—262) Measured spectra of neutrons escaping from iron spheres.** Holman, M. (Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren). 1982. 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902481.

Portions are illegible in microfiche products.

The report describes measuring the spectra of neutrons escaping from the surface of iron spheres in energy interval from 10 keV up to 10 MeV. The measurement has been performed using a scintillatoin spectrometer having a stilbene crystal, and a proportional counter SP-2 filled with hydrogen under 392.4 kPa of pressure. Used spheres had diameters of 20, 30, and 50 cm, Cf 252 being used as a source of neutrons.

2202 Components And Accessories

REFER ALSO TO CITATION(S) 44159, 44162, 44163, 44178, 44184, 44187, 44191, 44193, 44278

43853 **(CEA-CONF—6482) Finite element method for an ultra compressible flow.** Forestier, A. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 13p. (CONF-8209119—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702088.

From International symposium on detailed modelization of fluid flow; Paris, France (7 Sep 1982).

This paper deals with recent development on a finite element technique in order to compute two phase flow problems encountered in nuclear reactors. In the first part, the choice of a finite element method (F.E.M.) is discussed in order to compute 2 or 3 D problems and the homogeneous physical model is presented. Secondly, the kind of finite elements used in the computation is given with their consistency proprieties. After, we investigate a method of discretization for the non-linear set of equations : so, we study the linear stability of this system which leads to a semi-implicit time integration. We present, at least, the advantages by using this technique for computing multidimensional two phase flow problems.

43854 **(FEI—1261) Developing the algorithm and code for calculating an interchannel stability of steam generating channels.** Vorob'ev, V.A.; Loshchinin, V.M.; Remizov, O.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702092.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 4 figs.

The algorithm for calculating parameters of a two-phase flow and temperature field of the steam generating channel under dynamic conditions with account for supercritical zone is described. Application of the algorithm permits without essential count time increase to avoid numerical instability appearing in calculations owing to uncertainty of boundary location of the crisis (in the crisis area the heat transfer coefficient varies almost by two orders) between calculation points. The validity of the substitution of differential equation of heat conductivity of the wall for heat balance equation at temperature field calculations in the crisis area is shown. It is concluded that the lack of the wall dynamics account in the supercritical zone may lead to substantial error at calculation of flow parameters at the channel outlet.

43855 **(INIS-mf—7642) Photoelastic study of the effects of an impulsive seismic wave on a nuclear containment vessel.** Burger, C.P. (Iowa State Univ. of Science and Technology, Ames (USA). Engineering Research Inst.). 1981. 9p. (CONF-811273—2). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780889.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A dynamic photoelastic study of the progressive movement of a dilatational P-wave into a model of a nuclear containment vessel, is studied. The reflections at the dome abutments are observed and the strong flexural wave that deforms the dome itself is studied with photoelasticity and with dynamic strain gage procedures.

43856 **(INIS-mf—7657) Design and analysis for piping systems.** Sterkel, H.P.; Cutrim, J.H.C. (NUCLEN, Rio de Janeiro (Brazil)). 1981. 11p. (CONF-811273—31). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780924.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The procedure and the typical techniques that are used in NUCLEN for the design and the calculation of the piping of Nuclear Plants. The classification system are generically described and the analysis techniques which are used for the design and verification of the piping systems, i.e. pressure design for the dimensioning of the wallthicknesses, temperature and dead weight analysis together with determination of support points, are shown. The techniques of dynamic design and analyses are described for earthquake and pressure impulse loadings.

43857 **(LCC—014/82) Mechanical modelling of a structural performance of a pressure vessel submitted to the creep phenomenon.** Taroco, E.; Feijoo, R.A.; Monteiro, Edson; Freire, J.L.F.; Bevilacqua, L.; Miranda, P.E.V. de; Pascual, R.; Silveira, T.L. da. (Laboratorio de Computacao Cientifica, Rio de Janeiro (Brazil)). 1982. 24p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702141.

A pressure vessel is analyzed using different mechanical models for the creep phenomenon. The numerical results obtained through these models provide verification of creep damage accumulation in structures.

43858 (NUREG/CP—0044-Vol.1, pp 65-88) **Cyclic crack growth in high-temperature water-results of an international testing round robin.** Jones, R.L. (Electric Power Research Inst., Palo Alto, CA). May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

The results are reported of a testing round robin performed under the auspices of the International Cyclic Crack Growth Group. Fourteen members of the Group participated in the round robin, in which measurements of cyclic crack growth rate were made on nominally identical compact tension specimens of SA533B pressure vessel steel immersed in high purity water at 561K. The plots of crack growth per cycle versus stress intensity factor range obtained by the participants were in acceptable agreement for specimens tested at a frequency of 1 Hz differed by up to an order of magnitude (in terms of crack growth rate) for tests at 0.017 Hz. Possible sources of interlaboratory scatter are discussed and it is suggested that the observed variations in the environmental contribution to crack growth arise because of inadvertent differences between the chemical environments to which the specimens were exposed during testing. Plans for a second testing program are reviewed.

43859 (NUREG/CP—0044-Vol.2, pp 143-171) **Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels.** Shoji, T. (Tohoku Univ., Sendai, Japan); Takahashi, H.; Nakajima, H.; Kondo, T. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Some groundwork is laid for Design Code development for pressure vessels by discussing from a mechanistic standpoint of the role of loading variables (mechanical factors) in corrosion fatigue crack growth acceleration. (LEW)

43860 (NUREG/CP—0044-Vol.2, pp 173-197) **Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments.** Atkinson, J.D.; Cole, S.T.; Forrest, J.E. (Central Electricity Research Labs. Leatherhead, England). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Fatigue crack propagation rates have been measured in A533B pressure vessel steel exposed to simulated PWR environment over the temperature range 25 to 290°C. At low R ratios with sine wave loading at 1 cpm an environmental enhancement over equivalent air data of up to X7 was observed at 290°C in static low oxygen water (< 10 ppB) at a measured specimen potential of -840mV (SHE). A minimum fatigue crack growth rate was observed at 200°C with different apparent activation energies above 175°C and below 175°C. A model of the cracking process is presented in which the environmental enhancement is related to crack opening rate during the ascending stress part of the fatigue cycle. The model is discussed in relation to PWR corrosion fatigue data on the effects of waveshape, frequency and R-ratio.

43861 **(ORNL-tr—4875) Assessment of fracture toughness of heavy-section steels for nuclear pressure vessels.** Nakano, Y.; Sano, K.; Tanaka, M.; Ohashi, N. Translated from *Kawasaki Seitetsu Giho ;* **12**: No. 4, 593-610(1980). Contract W-7405-ENG-26. 28p. NTIS, PC A03/MF A01. Order Number DE82021362.

Portions are illegible in microfiche products.

Fracture-toughness tests were conducted on three heats of nuclear pressure-vessel steel plate (SA533B Cl. 1), a submerged arc-welding joint of one of the same plates, and three heats of forged steel for nuclear pressure vessels (SA508 Cl. 3) to evaluate the static fracture toughness K/sub IC/, dynamic fracture toughness K/sub Id/ and crack arrest toughness K/sub Ia/. These test results showed that the lower boundaries of K/sub IC/, K/sub Ia/ and all the fracture-toughness data points lay above the K/sub IC/, I/sub Ia/ and K/sub IR/ curves given by ASME Boiler and Pressure Vessel Code, respectively. Further discussion was made on these three fracture toughness parameters.

2203 Fuel Elements

43862 **(FEI—1251) Void fraction and temperature in subcooled liquid flow in an annular channel.** Kanukhina, S.V.; Kashcheev, V.M.; Yur'ev, Yu.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1981. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702090.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 5 figs.

Two-dimensional fields of real void fraction and temperature during the water flow not heated up to the temperature of saturation in the vertical concentric annular channel heated from inside and outside by heat flow arbitrarily changed along the length of the channel are calculated. The two-phase flow is substituted by the homogeneous mixture in the suggested model. The model permits to calculate the real void fraction and temperature depending on the longitudinal and transverse coordinates. The problem has been solved in the BESM-6 computer by the pass method. The conservative five-point Samarsky flowsheets have been used for final-difference approximation. The results of the calculation and the experiment satisfactorily agree at rather high void fraction.

43863 **(FEI—1252) Entrainment effect on burnout in dispersed-annular flow (on the base of numerical experiment results).** Kashcheev, V.M.; Muranov, Yu.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1981. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702091.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 6 figs.

Evaluation of the effect of ablation flow as compared with evaporation and sprinkling flows on the coordinate of burnout is carried out using the TM-DISCO program plotted on the base of earlier developed mathematical model of dispersed-annular and dispersed flows. It is stated that artificial change of the ablation flow at low mass rates is compensated by the corresponding change of the sprinkling flow. The increasing role of the evaporation flow in the burnout development is pointed out in this case. The value of the ablation flow for the burnout increases with the growth of mass rate. The numerical experiment is conducted for 9.8-13.7 MPa pressure and 260-1000 kg/m^{2}s mass rate.

43864 **(INIS-mf—7658) Heat conduction in a plate-type fuel element with time-dependent boundary conditions.** Faya, A.J.G.; Maiorino, J.R. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)). 1981. 9p. (In Portuguese). (CONF-811273—33). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780926.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A method for the solution of boundary-value problems with variable boundary conditions is applied to solve a heat conduction problem in a plate-type fuel element with time dependent film coefficient. The numerical results show the feasibility of the method in the solution of this class of problems.

43865 **(UFRJ-COPPE-PEN—113) Energy supply and the swelling in solid fuels.** Roberty, N.C. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia). Sep 1981. 27p. (In Portuguese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702143.

A new simplified model for the modelling of nuclear fuel swelling, analysis of some aspects of energy supply and the inequality of entropy in these fuels, was developed.

43866 **Water level sensor and temperature profile detector.** Tokarz, R.D. (to Dept. of Energy). US Patent 4,385,519. 31 May 1983. Filed date 29 Jan 1981. vp.

PAT-APPL-229423.

A temperature profile detector comprising a surrounding length of metal tubing and an interior electrical conductor both constructed of high temperature high electrical resistance materials. A plurality of gas-filled expandable bellows made of electrically conductive material is electrically connected to the interior electrical conductor and positioned within the length of metal tubing. The bellows are sealed and contain a predetermined volume of a gas designed to effect movement of the bellows from an open circuit condition to a closed circuit condition in response to monitored temperature changes sensed by each bellows.

2204 Control Systems

43867 **(AECL—7519) Control and instrumentation systems for the 600 MWe CANDU PHW nuclear power plants.** Lepp, R.M.; Watkins, L.M. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Feb 1982. 23p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701806.

The control and instrumentation systems for CANDU power plants are designed for high reliability and availabilty to meet stringent safety and operational requirements. To achieve these goals a 'defence-in-depth' design philosophy is employed. The diversely functioning systems designed to satisfy these requirements are described, along with the extensive use of computers for important plant control and man-machine functions.

43868 **(AECL—7687) Design of multivariable controller for a 600 MWe CANDU nuclear power plant.** Mensah, S.; McMorran, P.D. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). Apr 1982. 36p. (CONF-8204114—1). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701808.

From Simulation symposium on reactor dynamics and plant control; Mississauga, Canada (19 Apr 1982).

This paper reports the results of a case study on the design of a multivariable regulator for a nuclear power station of the Gentilly-2 type. In this study, a design model was derived by simplifying and linearizing equations in the G2SIM non-linear model. Open-loop simulation showed good agreement between transient responses of both models. After a critical review of multivariable design techniques, the authors explored pole shifting with output feedback. A comprehensive set of application-oriented algorithms for closed-loop pole shifting, implemented via modules in the MVPACK computer-aided design package were derived. A controller was designed for the linear model, then implemented on the non-linear simulation. After adjustment of controller gains, mainly in the dynanamic section of the feedback, simulation results showed that the performance of the multivariable controller on G2SIM is satisfactory. The results demonstrate the relative superiority of the multi-variable controller over the existing conventional controller.

43869 **(EGG-M—17282) Estimation of bias shifts in a steam-generator water-level controller.** Tylee, J.L. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 20p. (CONF-830628—7). NTIS, PC A02/MF A01. Order Number DE83015120.

From American control conference; San Francisco, CA, USA (22 Jun 1983).

A method for detecting and estimating the value of sudden bias shifts in a U-tube steam-generator water-level controller is described and evaluated. Generalized likelihood ratios (GLR) are used to perform both the bias detection and bias estimation. Simulation results using a seventh-order, linear, discrete steam-generator model demonstrate the capabilities of the GLR detection/estimation approach.

43870 **(EGG-M—30982) Computer-based regulating control system for the Advanced Test Reactor.** Johnson, M.R. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 16p. (CONF-830609—39). NTIS, PC A02/MF A01. Order Number DE83015126.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

This paper describes a new control system which has recently been designed and installed at the Advanced Test Reactor at INEL, replacing an older system that had been in service for some 17 years. Based on modern digital technology, the new system provides improved capability, reliability, and an enhanced man/ma-

chine interface that includes comprehensive failure and error messages and voice synthesis. In addition to control functions, and transparent to the operator, the system performs continual on-line checks to sense subsystem failures and takes appropriate automatic action. In the maintenance mode, service technicians can carry on a dialog with the controller to quickly identify faulty components. The operational capabilities of the new system are summarized, and reactor operator training, experience, and acceptance of the system are discussed.

43871 (INIS-mf—7666, pp vp) **Adjusts of control rod cross sections and its utilization in power distribution calculations for Angra-1 reactor.** de Pina, C.M. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

One of the most important part in neutronics calculations is the study of core behavior with inserted control rods. The first stage of this calculations consists in generating equivalent microscopic cross sections for the basic cells containing fuel or absorbed material. The cross sections will be then adjusted. The choice of parameters that help in those adjustments, were obtained by the comparisons of data coming from the control rod supercell calculations with the Hammer and Citation computer codes. The effect of those adjustments in core integral parameters was evaluated; in this work only the core power two-dimensional distribution calculations with the D bank completely inserted, is studied.

43872 **(NRCN—514) Microprocessor-based power control data acquisition system.** Greenberg, S. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev; Ben-Gurion Univ. of the Negev, Beersheba (Israel)). Oct 1982. 109p. (In Hebrew). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83701795.

Thesis.

The project reported deals with one of the aspects of power plant control and management. In order to perform optimal distribution of power and load switching, one has to solve a specific optimization problem. In order to solve this problem one needs to collect current and power expenditure data from a large number of channels and have them processed. This particular procedure is defined as data acquisition and it constitutes the main topic of this project. A microprocessor-based data acquisition system for power management is investigated and developed. The current and power data of about 100 analog channels are sampled and collected in real-time. These data are subsequently processed to calculate the power factor (cos phi) for each channel and the maximum demand. The data is processed by an AMD 9511 Arithmetic Processing Unit and the whole system is controlled by an Intel 8080A CPU. All this information is then transfered to a universal computer through a synchronized communication channel. The optimization computations would be performed by the high level computer. Different ways of performing the search of data over a large number of channels have been investigated. A particular solution to overcome the gain and offset drift of the A/D converter, using software, has been proposed. The 8080A supervises the collection and routing of data in real time, while the 9511 performs calculation, using these data.

43873 **(NUREG/CR—3289) Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981.** Meachum, T.R.; Atwood, C.L. (EG and G Idaho, Inc., Idaho Falls (USA)). May 1983. Contract AC07-76ID01570. 191p. (EGG—2258). NTIS, PC A09/MF A01 - GPO. Order Number DE83014939.

Portions are illegible in microfiche products.

This report presents estimates of common cause fault rates and related quantities, based on Licensee Event Reports of instrumentation and control assemblies in nuclear reactors. The Licensee Event Report data base is briefly described, and imperfections in the data are discussed. The components are grouped into assemblies, for which rates are estimated. For estimating rates, the binomial failure rate model is used, extended to allow for the substantial observed plant-to-plant variability, and for shocks that by their nature cause all the assemblies in a system to fail. Every quantity is estimated by both a point estimate and a 90% interval. All rates are expressed per calendar hour.

2205 Environmental Aspects

REFER ALSO TO CITATION(S) 43961, 44020

43874 **(CEA-CONF—6402) Iodine determination in a PWR reactor during normal operation.** Benerech, G.; Cerf, J. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)). Sep 1981. 37p. (In French). (CONF-810964—4). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702071.

From Seminar on iodine removal from gaseous effluents in the nuclear industry; Mol, Belgium (21 Sep 1981).

Iodine determinations were systematically carried out on the containment vessel and the storage pond hall of the 900 MW PWR reactor in normal operation and on shutdown for discharging. The results obtained made it possible to evaluate a transfer factor for the iodine from primary water leaks, check the homogeneity of the atmospheric iodine concentration, bring to light (during reactor shutdown) a desorption effect of the iodine initially fixed to the walls of the vessel, and work out an air/water apportionment coefficient in the discharging and storage ponds. Ancillary determinations in the water and gas phases of the RCV vessel (volumetric and chemical monitoring tank) enabled an apportionment coefficient to be worked out for the iodine and gave rise to an interpretation test on the various chemical forms of the iodine present in the primary system.

43875 **(DSN—559) Determination of seismic reference motions on nuclear sites in France.** Levret, A.; Mohammadioun, B. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)). Aug 1982. 36p. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702072.

For the assessment of seismic hazard on a site, the Nuclear Safety Department makes use a seismotectonic method which entails the definition of specific reference motions on each site. It includes two steps: 1. As thorough an analysis as possible of macroseismic data to define the characteristics (intensity, magnitude, focal distance) of reference earthquakes. 2. The calculation of ground motion from statistical study of strong motion records collected in a data bank. Particular attention has recently been drawn to determining the appropriate manner for taking nearby, low-magnitude earthquakes into account. The application of this method to an actual case (the July 15, 1980 Kembs earthquake) makes it possible to verify the validity of the method.

43876 **(NUREG—1011) Draft environmental statement related to steam-generator repair at Point Beach Nuclear Plant, Unit No. 1, Docket No. 50-266.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jul 1983. 42p. NTIS, PC A03/MF A01 - GPO. Order Number DE83902873.

Portions are illegible in microfiche products.

The staff has considered the environmental impacts and economic costs of the proposed steam generator repair at the Point Beach Nuclear Plant Unit No. 1 along with reasonable alternatives to the proposed action. The staff has concluded that the proposed repair will not significantly affect the quality of the human environment and that there are no preferable alternatives to the proposed action. Furthermore, any impacts from the repair program are outweighed by its benefits.

43877 **(NUREG/CR—3132) Concentration and distribution of copper in effluents from the H.B. Robinson Steam Electric Plant.** Harrison, F.L.; Bishop, D.J.; Rice, D.W. Jr.; Knezovich, J.P. (Lawrence Livermore National Lab., CA (USA)). Jan 1983. Contract W-7405-ENG-48. 38p. (UCRL—53047). NTIS, PC A03/MF A01 - GPO. Order Number DE83015453.

Water and bedload sediments were sampled at the intake and discharge areas of the H.B. Robinson Steam Electric Plant and at a

control area upstream of the plant in November 1979 and May and July 1980. Water samples were analyzed for total, for soluble and particulate, and for labile and bound copper; sediments were analyzed for total copper. During the July field survey, samples were taken at three additional sites downstream of the plant. Total copper concentrations in water samples from the discharge area were always higher than in those from the intake. Concentrations of copper in discharge waters ranged from 33 to 79 μg/L, whereas those in intake waters ranged from 27 to 58 μg/L. The concentration of copper in the water in the control area upstream from the power station ranged from 3.1 to 5.8 μg/L; this was significantly lower than that in the discharge and intake areas.

43878 **Sensitivity analysis of the meteorological model applied in the German risk study (DRS).** Vogt, S. (Kernforschungszentrum Karlsruhe, Federal Republic of Germany). pp 1196-1206 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

In the first part of this paper it will be shown how the influence of uncertainties in estimation on risk statements is determined using methods of the probability theory. In particular the parameters contained in the dispersion model are studied more thoroughly. In the second part, based on the knowledge gathered in the previous investigations, new and more realistic best estimate values will be proposed for four selected parameters to be used in future work. The modifications in the risk statements by these new parameter values will be commented upon.

43879 **Reactor siting risk comparisons related to recommendations of NUREG-0625.** Barsell, A.W.; Dombek, F.S.; Silady, F.A. (General Atomic Co., San Diego, CA). pp 1124-1130 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—). Contract AT03-76ET35300.

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Evaluation was made of how lower near-plant population densities relevant to NUREG-0625 proposals affect site specific public risks of severe accidents for light water reactors (LWRs) and high-temperature gas-cooled reactors (HTGRs). A measurable reduction in early fatalities within the near (0 to 8 km) population is predicted for low probability LWR accidents but the reduction in overall (including non-nuclear) individual risks is insignificant. No early fatalities are predicted due to HTGR accidents. There is no appreciable reduction in number of latent fatalities due to LWR or HTGR accidents. It is concluded that remote siting offers minor societal risk benefit for LWRs and no significant benefit for HTGRs.

43880 **Methodology and practical basis for emergency planning in case of accidental releases.** Le Grand, J.; Hamard, J.; Parmentier, N.; Manesse, D.; Devillers, C. (Inst. de Protection et de Surete' Nucleaire, Fontenay-aux-Roses, France). pp 1216-1225 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Statistical methods are used to anticipate offsite consequences resulting from an accidental release of radioactivity into the atmosphere for the 1-100 km range. This approach is very useful for safety purposes, for example to select nuclear sites; but it cannot be used for emergency preparedness plans. The preparation of emergency plans must be dependent upon the type of nuclear facility and site characteristics, and should take into account the conditions pertaining to the time of application (e.g. weather). In other words, the preparation of an emergency situation depends upon all the specific characteristics of each site. The plan has to be established considering a wide range of accidents which could occur at the site, including those with a very low probability of occurrence. Furthermore, emergency countermeasures have to be provided for in view of the radiological risk to individual members of the public. This implies calculation of the "projected" dose due to external irradiation (plume and deposits) and inhalation (plume and resuspension of deposits). Calculations are based on the use of an atmospheric transfer model as simple and as realistic as possible so that it can cover a wide range of situations. A description of the model used by the French Institute of Protection and Nuclear Safety is given, together with an appropriate example.

43881 **Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department.** Duco, J. (Departement de Surete Nucleaire, Fontenay-aux-Roses, France); Manesse, D.; Duchemin, B.; Maire, D. pp 1186-1195 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Anticipated assessment of offsite consequences resulting from an accidental release of radioactivity into the atmosphere is commonly made, for the 1-50 km range, by application of statistical treatments, based on meteorological records, to a set of dose-distance relationships previously calculated by means of the ALICE computer code for various weather conditions, release durations and exposure modes. Input data comprise population distribution around the site and weather data, the latter consisting of mean frequencies per angular sector for short release duration problems or of actual records to account for weather variability in the case of prolonged releases. Consequences are currently expressed in terms of complementary cumulative distribution functions for various dose levels. An application to a reference site is presented.

43882 **Measurement of in situ dynamic properties in relation to geologic conditions.** Dobecki, T.L. (Sandia Lab., Albuquerque, NM). *Reviews in Engineering Geology;* 4: 201-214(1979).

Evaluation of nuclear power plant sites from a material stability standpoint requires measurement of in situ dynamic properties. These are derived from measurement of shear-wave propagation velocity in subsurface materials by utilizing either the seismic downhole or seismic cross-hole techniques, or both. The downhole technique is rapid and less expensive than the cross-hole survey but is limited in maximum survey depth and resolution of thin, higher velocity beds. The cross-hole test, although less subject to depth and resolution limitations, requires more boreholes and is therefore more expensive. This test is also more exacting because of borehole drift considerations and timing corrections that may not be required for the particular energy source used. Actual field cross-hole examples for several sites of varied subsurface geology illustrate the variation of shear velocity versus material make-up and condition. High shear-wave velocities are characteristic of massive crystalline rock, whereas fractured rock and unconsolidated sediments show progressively reduced values. The combination of the dynamic model with a proposed design earthquake event produces the basic data upon which site evaluation from an engineering standpoint may be made. An example from a deep sand sediment site shows the increased potential for liquefaction as the strength of the design earthquake is increased.

2206 Research, Test, And Experimental Reactors

REFER ALSO TO CITATION(S) 43817, 43870, 43900

43883 **(CEA-CONF—6434) Immersed multipurpose device for the inspection of PWR spent pencils in a loop reloaded in the Osiris pool.** Farny, Gerard. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 20p. (In French). (CONF-820967—3). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702128.

From International topical meeting on irradiation technology; Grenoble, France (28 Sep 1982).

The equipment for the examination of fuel cans of irradiated fuel pencils by eddy current testing in the pool is described. Despite a high residual power there are no mechanical strains for the cladding and no interference with cooling. A high detection sensitivity is obtained. Friction is eliminated by water cushions and speed of operation is limited only by safety and data acquisition.

43884 **(CEA-CONF—6435) ISABELLE-4 loop: a PWR testing loop loaded and unloaded in the pool of the Osiris reactor.** Lucot, Michel. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 17p. (In French). (CONF-820967—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702129.

From International topical meeting on irradiation technology; Grenoble, France (28 Sep 1982).

The installation for loading and unloading of fuel pencils in the pool of the Osiris reactor is presented. This installation includes an irradiation loop and an associated loading-unloading device immersed in the pool. The evolution of the characteristics and the conditions of the tested fuel pencils can be followed. Examinations can be made at any time during irradiation. Irradiation conditions can be changed for each irradiation period as a function of results obtained after analysis.

43885 **(CEA-CONF—6445) New steady state medium flux neutron source.** Farnoux, B.; Cribier, D. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 13p. (CONF-820935—10). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702158.

From 6. Yamada conference on neutron scattering of condensed matter; Tokyo, Japan (1 Sep 1982).

A new steady state neutron source is in operation on the Atomic Energy Commission Site of Saclay (France). It is a pool type nuclear reactor, using enriched uranium fuel elements together with a heavy water tank as moderator, and specially designed to provide neutron beams for fundamental and applied research. At full power of 14 Mw, the maximum unperturbed neutron flux reaches $3x10^{14}n/cm^2s$ and the reactor is operated twenty four hours per day in a three months cycle. Twenty horizontal neutron beams can be used in the reactor hall or transmitted to a large external hall by cold neutron guides. Several vertical tubes allow radioisotope production and activation analysis. In a first stage nineteen experimental facilities are planed including thirteen spectrometers for elastic scattering studies and six spectrometers for spectrometry studies.

43886 **(EGG-M—08983) LOFT uncertainty-analysis methodology.** Lassahn, G.D. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 10p. (CONF-830609—36). NTIS, PC A02/MF A01. Order Number DE83015136.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

The methodology used for uncertainty analyses of measurements in the Loss-of-Fluid Test (LOFT) nuclear-reactor-safety research program is described and compared with other methodologies established for performing uncertainty analyses.

43887 **(HMI-B—383) Proposal for extension of the Berlin Research Reactor BER II.** Axmann, A.; Buchholz, H.; Dachs, H.; Lechner, R.; Vorderwisch, P.; Wasserroth, K. (Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)). May 1982. 80p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750916.

The HMI worked out an extension project for the BER II-reactor, the major objectives of which are to make a proposal to be realized by the mid-eighties, to keep the reconstruction cost lower than the construction cost of a new reactor would be, and to tailor the reconstruction measures to the needs of external users. In detail the extension project comprises the following measures: increase of power from 5 to 10 MW, installation of a beryllium reflector and a cold neutron source, building of an experimental hall with 3 neutron conductors that are fed by the cold neutron source, installation of some more neutron spectrometer, and provision of additional room for offices and laboratories.

43888 (INIS-mf—7666, pp vp) **Experimental fast reactors: self-sustained symetric and asymetric oscillations and viability as a source of pushed neutrons.** do Amorim, E.S.; de Moura Neto, C.; Rocamora, F.D. Jr. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A stability criterion was established based upon the 'zero power' the feedback transfer functions. Through an analog simulation effects related to the periodical insertion of reactivity with wide amplitude, the treatment of oscillations introduced by radial movements of the fuel element and self-sustained oscillations were studied.

43889 (INIS-mf—7666, pp vp) **Neutronic calculation of the next fuel elements for the Argonaut reactor.** Oliveira, C.R.E.; de Brito Aghina, L.O. (Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The best parameters of the next fuel elements of the Argonaut reactor, at IEN (Instituto de Engenharia Nuclear - Brazil), were determined. The next fuel elements will be rods of an uranium mixture (19.98% enriched), graphite and bakelite. The parameters to be determined are: mixture density, percentage of uranium in the mixture, pellet radius, rod material and elements arrangement (step). The calculations routines consisted in the analysis of several steps, using the LEOPARD computer code for cell calculations and RMAT1D for one dimensional spatial calculations (criticality) with four energy groups. Finally a neutronic study of the Argounat reactors present configuration was done, using the HAMMER computer code (cell), the EXTERMINATOR computer code (two-dimensional calculations) and RAMAT1D.

43890 **(IPEN-Pub—43) Experience and research with the IEA-R1 Brazilian reactor.** Fulfaro, R.; de Sousa, J.A.; Nastasi, M.J.C.; Vinhas, L.A.; de Lima, F.W. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Operacao e Utilizacao do Reator de Pesquisas). Jun 1982. 16p. (CONF-8109117—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702159.

From Seminar on research reactor operation and use; Juelich, F.R. Germany (14 Sep 1981).

The IEA-R1 reactor of the Instituto de Pesquisas Energeticas e Nucleares, IPEN, of Sao Paulo, Brazil, a lighwater moderated swimming-pool research reactor of MTR type, went critical for the first time on September 16, 1957. In a general way, in these twenty four years the reactor was utilized without interruption by users of IPEN and other institutions, for the accomplishment of work in the field of applied and basic research, for master and doctoral thesis and for technical development. Some works performed and the renewal programme established for the IEA-R1 research reactor in which several improvements and changes were made. Recent activities in terms of production of radioisotopes and some current research programm in the field of Radiochemistry are described, mainly studies and research on chemical reactions and processes using radioactive tracers and development of radioanalytical methods, such as neutron activation and isotopic dilution. It is also presented the research programmes of the Nuclear Physics Division of IPEN.

43891 **(JINR—10-82-407) Software for the SONET computer network intended for automation of scientific experiments.** Aleksandrova, I.V.; Alfimenko, A.V.; Veber, R.; Sever'yanov, V.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 6p. (In Russian). (CONF-8206172—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702216.

From 2. All-Union seminar on automation of scientific research on nuclear physics and adjoining areas; Novosibirsk, USSR (29 Jun 1982).

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 3 figs.

The results of the first stage of works on development of the computer network SONET (Scientific Oriented Network) intended for complex solution of the problem of automation of scientific experiments performed with beams of pulsed research reactors IBR-30 and IBR-2 are described. The physical configuration of the network, its logical structure, its protocols and items of the software are considered. The SONET network configuration comprises ten

computers. The most powerful of them is the medium class computer PDP-11/70. Directly connected with the latter are PDP-11/20 mini-computer and MERA-60-10 micro-computer and through CM-4 connected up are 5 computers CM-3 and one MERA-60-30. All intermachine connections are realized by means of asynchronous consequent interfaces. The CM-3 and MERA-60-30 computers through the CAMAC apparatus are connected up to experimental facilities. The conclusion is drawn that at the first stage of the SONET network development the principles of the network archivization system are laid down and the possibility of remote treatment is ensured, the information channel protocol and the principles of higher level protocols are elaborated, the principles of the command network language and problem-oriented higher-level language for programming of experiments are laid down.

43892 **(NIIAR—60(513)) Fast neutron fluxes and spectra in the RBT-6 reactor channels.** Pimenov, V.V.; Polyakov, Yu.N. (Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)). 1981. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702160.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 6 figs.; 5 tabs.

The technique of calculating the fast neutron flux differential energy density in the RBT type reactors is described. Calculational results on the fast neutron flux density and energy spectra for the RBT- reactor channels are given. The Monte Carlo method realized in the TAU code with modified geometric module is used for calculations. Comparison of calculational and experimental data on the values of ^{58}Ni activation integrals measured in the RBT-6 reactor channels shows adequate accuracy of calculations. The conclusion is made that the TAU code modified version may be recomended for calculating the fast neutron spectra and flux density in reactors with fuel assemblies of square configuration.

43893 **(ORNL/TM—8747) Oak Ridge Research Reactor quarterly report, October, November and December 1982.** Corbett, B.L.; Lance, E.D. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 36p. NTIS, PC A03/MF A01. Order Number DE83015073.

The ORR operated at an average power level of 29.5 MW for 85.7% of the time during October, November, and December of 1982. The reactor was shut down on fifteen occasions, five of which were unscheduled. Reactor downtime needed for refueling and checks was normal. The reactor remained available for operation 92.3% of the time. Maintenance activities, both mechanical and instrument, were essentially routine in nature with the exception of two Reactor Instrumentation and Controls Design Change memorandums and one Mechanical Design Change Memorandum. In-service inspection completed during the quarter included: (1) inspection of ORR 20-in. primary coolant pipe, (2) inspection of ORR pool window, and (3) inspection of ORR number three primary water pump.

43894 **(LA—4037-SOP-Rev.2-Suppl.1) Pajarito Plan for Radiation Emergency. Standard operating procedures.** Malenfant, R.E. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 6p. NTIS, PC A02/MF A01. Order Number DE83014774.

The Pajarito Plan for Radiation Emergency identifies possible accidents specific to the operations of the Los Alamos Critical Assemblies Facility, specifies the appropriate actions to take in the event of an accident, and assigns responsibility for those actions.

2207 Plutonium And Isotope Production Reactors

43895 **(RBS—3(rev.)) Control of the ASTRA decay heat removal system.** Nedelik, A. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Nov 1982. 6p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702145.

To ensure a minimum of core cooling even under severest accident conditions (loss of reactor pool water) a core spray system for decay heat removal has been installed at the ASTRA-reactor. The automatic and manual control of the system, its power supply and test procedures are shortly described.

2209 Reactor Safety

REFER ALSO TO CITATION(S) 43404, 43826, 43879, 43886, 44444, 44445

43896 **(AEEW-R—1506) UK MT-3 ballooning test in the Battelle NRU loop.** Gibson, I.H.; Coddington, P.; Healey, T.; Mann, C.A. (UKAEA Atomic Energy Establishment, Winfrith). Apr 1982. 54p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701796.

The ballooning response of PWR fuel rods under postulated LOCA conditions has been the subject of intensive investigations. The UK MT-3 ballooning test was a co-operative international exercise which was technically very successful. This report describes the pre-test planning and calculations carried out in the UK and then describes in some detail the thermal hydraulic and clad deformation results.

43897 **(AEEW-R—1529) MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description.** Bowring, R.W.; Cooper, C.A.; Haste, T.J. (UKAEA Atomic Energy Establishment, Winfrith). Apr 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701797.

MABEL can be used to determine the cladding deformation in a PWR during a LOCA. It takes the results of calculations from other codes to define the initial fuel condition and the transient whole core thermal-hydraulic behaviour. The use of MABEL with input data appropriate to different regions of a reactor core allows an overall picture of coolant channel blockage within the core to be obtained.

43898 **(AEEW-R—1531) MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes.** Bowring, R.W.; Cooper, C.A. (UKAEA Atomic Energy Establishment, Winfrith). Apr 1982. 112p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83701798.

MABEL-2 has been developed to predict the extent of cladding deformation in PWR fuel rods during a loss of coolant accident. The user notes describe how to run MABEL. They include case preparation and input data, the job control language, a description of the output tables available, and aids to debugging. The input data and results for two sample cases are given.

43899 **(CONF-820662—6) High-temperature oxidation of Zircaloy in hydrogen-steam mixtures.** Chung, H.M.; Thomas, G.R. (Argonne National Lab., IL (USA); Electric Power Research Inst., Palo Alto, CA (USA)). Sep 1982. Contract W-31-109-ENG-38. 29p. NTIS, PC A03/MF A01. Order Number DE83014687.

From 6. international conference on zirconium in the nuclear industry; Vancouver, BC, Canada (28 Jun 1982).

Oxidation rates of Zircaloy-4 cladding tubes have been measured in hydrogen-steam mixtures at 1200 to 1700°C. For a given isothermal oxidation temperature, the oxide layer thicknesses have been measured as a function of time, steam supply rate, and hydrogen overpressure. The oxidation rates in the mixtures were compared with similar data obtained in pure steam and helium-steam environments under otherwise identical conditions. The rates in pure steam and helium-steam mixtures were equivalent and comparable to the parabolic rates obtained under steam-saturated conditions and reported in the literature. However, when the helium was replaced with hydrogen of equivalent partial pressure, a significantly smaller oxidation rate was observed. For high steam-supply rates, the oxidation kinetics in a hydrogen-steam mixture were parabolic, but the rate was smaller than for pure steam or helium-steam mixtures. Under otherwise identical conditions, the ratio of the parabolic rate for hydrogen-steam to that for pure steam decreased with increasing temperature and decreasing steam-supply rate.

43900 **(EGG-M—01183) PWR small-break analysis using a PDP-11/AD10 computer system.** Venhuizen, J.R.; Hyer, F.K. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 6p. (CONF-830609—37). NTIS, PC A02/MF A01. Order Number DE83015119.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

A simulation of a pressurized water test reactor was developed to predict the dynamic response of the primary coolant system to gradual voiding caused by an anticipated transient or a small break. Comparison of the simulation results with data from the LOFT test reactor at the Idaho National Engineering Laboratory was performed to verify the models. The simulation, designed to operate on a PDP-11/55 minicomputer and Applied Dynamic AD10 synchronous digital computer, was used interactively to do scoping analysis prior to running the transient at the test reactor.

43901 **(EGG-M—01883) Fault trees and the impact of human variability on probabilistic risk analysis.** (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 6p. (CONF-830609—38). NTIS, PC A02/MF A01. Order Number DE83015125.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

It has long been recognized that human reliability is an important factor in probabilistic risk analysis. In the field, this is true in a direct operational sense as well as in the areas of installation and maintenance. The interest in quantification arises from the desire to achieve optimum design in the human factors sense (operability-maintainability) and from the need to include human reliability considerations in probabilistic risk analysis to achieve complete and valid risk evaluation. In order to integrate human reliability into the system analysis, it is necessary to consider two questions. These relate to the way that human functions fit into the existing analytical models and methods as well as the nature of human failure mechanisms, modes and failure (error) rates.

43902 **(EGG-M—02283) Dynamic qualification of safety-related equipment.** Singh, J.N. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 6p. (CONF-830609—42). NTIS, PC A02/MF A01. Order Number DE83014957.

From ANS annual meeting; Detroit, MI, USA (12 Jun 1983).

In the United States, there are 71 commercially operating nuclear power plants and another 90 in various stages of construction. Because of the potential consequences of serious accidents, plant structures, systems, and components must have a demonstrated capability of performing safety functions during and after a dynamic event such as an earthquake. Each utility has a dynamic qualification program for safety related equipment. The Equipment Qualification Branch (EQB) of the Nuclear Regulatory Commission (NRC) has the lead responsibility in reviewing and evaluating these programs. Seismic Qualification Review Teams (SQRT) assist the NRC in carrying out this responsibility. This paper summarizes some significant aspects of this effort and lessons learned from participation in the SQRT over the last three years.

43903 **(EGG-M—09783) Overview of the PBF Severe-Fuel-Damage Program and results of the first test.** Appelhans, A.D.; MacDonald, P.E.; Hobbins, R.R.; McCardell, R.K. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 12p. (CONF-830563—2). NTIS, PC A02/MF A01. Order Number DE83015140.

From Enlarged halden program group meeting; Loen, Norway (23 May 1983).

Portions are illegible in microfiche products.

The United States Nuclear Regulatory Commission has initiated a severe-fuel-damage research program in the Power Burst Facility (PBF) to investigate fuel rod and core response, and fission-product and hydrogen release and transport during degraded-core-cooling accidents. This paper presents a description of the PBF Severe-Fuel-Damage Program and discusses the results of the first experiment.

43904 **(EGG-M—14682) Experimental damping data for dynamic analysis of nuclear power plant piping systems.** Ware, A.G. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 19p. (CONF-830607—18). NTIS, PC A02/MF A01. Order Number DE83014920.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Portions are illegible in microfiche products.

A summary of damping values reported in some recent piping system damping experiments and best estimate values for those systems is presented. The majority of the data is from tests conducted at the Heissdampfreaktor (HDR) in the Federal Republic of Germany. Data from the Kuosheng plant (Taiwan) and the LaSalle and Indian Point plants (US) are also included. From the data surveyed, the most significant influence on damping was the type of supports used. Other influential parameters were excitation level and response frequency. Remaining effects were minor or could not be determined from the available data. Rayleigh curve fits generally represent the data adequately and can be used in many structural codes. The USNRC Regulatory Guide 1.61 recommended damping values are shown to provide a conservative lower bound to the best estimate values reported, especially at frequencies below 20 Hz, for systems supported by seismic restraints.

43905 **(EGG-M—14882) Use of the modal superposition technique for piping system blowdown analyses.** Ware, A.G.; Macek, R.W. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 8p. (CONF-830607—19). NTIS, PC A02/MF A01. Order Number DE83015445.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

A standard method of solving for the seismic response of piping systems is the modal superposition technique. Only a limited number of structural modes are considered (typically those up to 33 Hz in the US), since the effect on the calculated response due to higher modes is generally small, and the method can result in considerable computer cost savings over the direct integration method. The modal superposition technique has also been applied to piping response problems in which the forcing functions are due to fluid excitation. Application of the technique to this case is somewhat more difficult, because a well defined cutoff frequency for determining structural modes to be included has not been established. This paper outlines a method for higher mode corrections, and suggests methods to determine suitable cutoff frequencies for piping system blowdown analyses. A numerical example illustrates how uncorrected modal superposition results can produce erroneous stress results.

43906 **(EGG-M—20082) Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a.** Dooley, W.T.; Mosby, W.R. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 28p. (CONF-830607—16). NTIS, PC A03/MF A01. Order Number DE83015142.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

Portions are illegible in microfiche products.

This paper presents comparisons between two computer code predictions and experimental measurements of the structural response of a pipe line/check valve system subjected to loading from a loss of feedwater transient. The piping system that was modeled and instrumented for measurement was the focus of German Standard Problem 4a; part of the Heissdampfreaktor Safety Program being conducted in the Federal Republic of Germany. The availability of their experimental data offered EG and G a unique opportunity to evaluate two structural codes' predictions, to compare them with each other, and to compare their predictions with the actual measured values of acceleration and displacement. A thermal-hydraulic code, SOLA-LOOP, computed the hydraulic behavior of the system. The hydraulic forcing functions were calculated and placed into the structural codes, NUPIPE-II and SAP IV. It was concluded that both computer programs provided comparable, realistic predictions of the piping system dynamic response to a blowdown load.

43907 **(EGG-M—26182) Nuclear power plant piping damping parametric effects.** Ware, A.G. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 9p. (CONF-830607—17). NTIS, PC A02/MF A01. Order Number DE83014965.

From American Society of Mechanical Engineers pressure vessel and piping conference; Portland, OR, USA (19 Jun 1983).

The NRC and EG & G Idaho are engaged in programs to evaluate piping-system damping, in order to provide realistic and less conservative values to be used in seismic analyses. To generate revised guidelines, solidly based on technical data, new experimental data need to be generated and assessed, and the parameters which influence piping-system damping need to be quantitatively identified. This paper presents the current state-of-the-art knowledge in the United States on parameters which influence piping-system damping. Examples of inconsistencies in the data and areas of uncertainty are explained. A discussion of programs by EG & G Idaho and other organizations to evaluate various effects are included, and both short-and long-range goals of the program are outlined.

43908 **(FEI—1257) Calculation of mixed convection in the intertube space of liquid metal heat exchangers.** Efanov, A.D.; Vlasova, V.N.; Vlasov, V.L.; Yur'ev, Yu.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1982. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702153.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 8 figs.; 1 tab.

Calculation technique obtained on the basis of the anisotropic porous body model for evaluation of the effect of the stationary natural convection in liquid metal heat exchangers of the BN type reactors is presented. To reveal the effects connected with the action of natural convection, the heat exchanger calculation model is idealized, namely: transition modes of heat exchangers operation are not considered, in calculations no interrelation of intertube space and the reactor vessel is indicated, only turbulent motion of the coolant in the intertube space is considered. It is shown that the effect of natural convection in the intertube space of such heat exchangers noticeably shows up at the Froude temperature number value Fr <= 0.05. This effect taken into account results in weakening of of calculation temperature non-uniformities of the tube bundle. It is shown that the complicated complex Asub(z)xFr (Asub(z)-volumetric resistance coefficient in longitudinal direction) simulation in some cases gives somewhat better results than the Froude number simulation.

43909 **(GA-A—17000) Safety-risk assessment of the HTGR steam-cycle/cogeneration plant.** Bender, D.M.; Dunn, T.D.; Houghton, W.J. (GA Technologies, Inc., San Diego, CA (USA)). May 1983. Contract AT03-76SF70046. 110p. NTIS, PC A06/MF A01. Order Number DE83014929.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The 2240 MW(t) SC/C site specific safety assessment is presented in the form of a summary report emphasizing highlights of the dominant risk results along with comparisons to national safety goals and previous HTGR studies. This report is the latest in a series of HTGR safety studies including accident initiation and progression analyses, fire studies, investment risk assessments, and quantitative safety goal proposals.

43910 **(GEND-INF—11-Vol.3) Reactor-building-basement radionuclide and source distribution studies. Volume 3.** Cox, T.E.; Horan, J.T.; Worku, G. (EG and G Idaho, Inc., Idaho Falls (USA)). Jun 1983. Contract AC07-76ID01570. 27p. NTIS, PC A03/MF A01. Order Number DE83014875.

The Three Mile Island Unit 2 (TMI-2) Reactor Building basement has been sampled several times since August 1979. This report compiles the analytical results and sample history for the liquid and solid samples obtained to date. In addition, basement radiation levels were also obtained using thermoluminescent dosimeters (TLDs). The data obtained will provide information to support ongoing mass balance and source term studies and will aid in characterizing the 282-ft elevation for decontamination planning and dose reduction.

43911 **(IKE—2-59) Theoretical investigations of mass- and energy transport in light water reactor containment buildings.** Hocke, K.D.; Bisanz, R.; Ploeger, G. (Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme). Dec 1982. 135p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750922.

In this report loss-of-coolant accidents in water-cooled nuclear power reactors will be described with regard to their effects on the reactor containment system. The general presentation of containment systems and the accident sequences is completed by performances of the physical and mathematical treatment of the flow dynamics. Following a survey of existing computer codes for containment analysis problems, a detailed model description of the computer codes ZOCO 6 and BEACON-MOD 2A is given. A variation of important model parameters within the ZOCO 6 program explains the field of application and leads to a valuation of the model assumptions. The obtained results are presented graphically including latest publications.

43912 (INIS-mf—7666, pp vp) **Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code.** Fernandes Filho, T.L. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

Transients caused by accidents as (1) loss of coolant, (2) failure in the principal pump and (3) power excursions were analysed. In the accident simulation, the Relap 4/Mod 3 computer code was used. The results obtained with the steady state model showed to be consistent with the project-and operation data of the experimental loop. For all the accidents analysed that considered the performance of safety systems, the highest temperature of the heating rods in the testing section did not exceed the permissible temperature.

43913 (INIS-mf—7666, pp vp) **First accident simulation of Angra-1 power plant using the ALMOD computer code.** Camargo, C.T.M. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The implementation of the german computer code ALMOD and its application in the calculation of Angra-1, a nuclear power plant different from the KWU power plants, demanded study and models adaptation, and due to economic reasons simplifications and optimizations were necessary. The first results define the analytical potential of the computer code, confirm the adequacy of the adaptations done and provide relevant conclusions about the Angra-1 safety analysis, showing at the same time areas in which the model can be applied or simply improved.

43914 (INIS-mf—7666, pp vp) **Use of thermal time constant concept in the analysis of reactivity induced accidents with feedback.** Narain, R. (Pernambuco Univ., Recife (Brazil). Centro de Energia Nuclear). 1981. NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A simple heat transfer model based on the thermal time constant concept which leads to significant reduction in fuel temperature computing time and gives a physical insight of the phenomena is presented. The fuel temperatures can be used to estimate the reactivity feedback using the measured or calculated Doppler coefficients.

43915 (INIS-mf—7666, pp vp) **Modifications of the bubble rise model and heat transfer model used in RELAP 4/Mod 5 computer code for transient analysis.** Scharfmann, E.; da Silva, D.E. . 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The modifications on the phase separation model and heat tranfer model in Relap4/Mod 5 computer code, in order to make more realistic estimates of the core thermohydraulic behavior submitted to a loss of coolant accident. This research is directed to the accident analysis caused by small breaks in the primary circuits of PWR plants, where two-phase flow occurs most of the time. Calculation have been performed with the help of the original version of Relap code, as well as the version containing the proposed modifications on this work. Comparing one results with the original ones, we arrive at the conclusion that our results show more conservative values of core pressure and coolant temperature, while the peak values of fuel temperature are not exceeded.

43916 (INIS-mf—7666, pp vp) **Adaptation of TOODEE-2 computer code for reflood analysis in Angra-1 reactor.** Praes, J.G.L.; Onusic, J. Jr. (FURNAS, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A method of calculation the heat transfer coefficient used in TOODEE-2 computer code for core reflood analysis in a loss of coolant accident, is presented. Preliminary results are presented with the use of heat transfer correlations based on FLECHT experiments adequate to a geometric arrangement such as 16 x 16 (Angra I). Optional calculations are suggested for the heat transfer coefficients when the cooling of fuel cladding by steam is used.

43917 (INIS-mf—7666, pp vp) **Contribution to the study of two-phase flow analysis considering the existence of a dynamic flow between the phases.** da Silva, M.C.; da Silva, D.E. 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

The linear momentum and energy equation of the Relap 4/ Mod 5 computer code were modified, permiting us to take in account the effects of slip between the phases of two phase flow. The modified computer code were used for the simulation of loss of coolant accident in Angra 1 power plant. The comparison of the results obtained by the modified version with experimental results show that the new model are more realistic.

43918 (INIS-mf—7666, pp vp) **Analysis of the loss of coolant accident due to open failure in the pressurizer relief valve, for Angra-1 reactor.** Freire, C.F.; Sacco, W. (FURNAS, Rio de Janeiro (Brazil)); Oliveira, L.F. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Posgraduacao de Engenharia). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A loss of coolant accident such that accured in TMI (Tree Mile Island) is analysed for Angra-1 reactor. A study is made of the modelling using the Relap 4 computer code.

43919 (INIS-mf—7666, pp vp) **Modelling for great breaks accident analysis in the primary system of Angra 1 reactor.** Serrano, M.A.B.; Vanni, E.A. (FURNAS, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

An analysis is made for a break in the cold leg, of the guillotine type with discharge coefficient C sub(D)=1.0, for the Angra 1 reactor. The computer codes, geometrical models and options used are described. A comparison between the method used and the requirements in the Appendix K of 10 CRF 50 is done.

43920 (INIS-mf—7666, pp vp) **Two-dimensional model for transients calculations with phase changes in sodium cooled reactors.** Granziera, M.R. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A computer code (NATOF2D) for the numerical simulation of situations where the radial non-uniformity in the sodium flow is an important factor, was developed. This computer code uses the two-fluid model, in which each phase is described by a complete set of mass conservation equations, energy equations and momentum equations. The experiment SLSF-P3A realized in the Engineering Test Reactor, Idaho, during the period of july to september of 1977, was simulated.

43921 (INIS-mf—7666, pp vp) **Development of a computer code for transients simulation in PWR type reactors.** Alvim, A.C.M.; Botelho, D.A.; de Oliveira Barroso, A.C. (Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro; Instituto de Engenharia Nuclear, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

A computer code for the simulation of operational-transients and accidents in PWR type reactors is being developed at IEN (Instituto de Engenharia Nuclear). Accidents will be considered in which variations in thermohydraulics parameters of fuel and coolant don't cause nucleate boiling in the reactor core, but, otherwise are sufficiently strong to justify a more detailed simulation than that used in linearized models.

43922 (Juel-Spez—183) **Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500.** Ehrhardt, K.D.; Jahn, W.; Krohn, H.; Rehm, W. (Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung). Nov 1982. 66p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750906.

This report presents an analysis of the consequences for the High Temperature Reactor PNP-500 which occur during core cooling accidents. The consequences of the temperature transients and the fission product behaviour are considered for the primary circuit. The analysis shows that, even for an extremely delayed start of the afterheat removal system, the retention of caesium in the graphite of the fuel elements and of the bottom reflector reduces the release of the coated particles by more than two orders of magnitude. The plate out in the steam generator leads temporarily to a further, however, much smaller retention of the release flow.

43923 (KFK—3325) **Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.** Boecking, G.; Exel, K.; Kaltenthaler, G.; Leister, K.H.; Preusser, T.; Schmelz, K.; Ehrlich, K.; Lassmann, K. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter). Jun 1982. 109p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750900.

This report includes eight single papers which are a report of activities performed at the IRT on the mechanics of fuel rods and fuel subassemblies and on the Simulation Irradiation Project.

43924 (KFK—3325, pp 36-48) **URANUS investigations on coolant channel temperature for Mol 7c.** Boecking, G. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

URANUS investigations relating to the LOF and blockage experiment Mol 7c.

43925 (KFK—3325, pp 49-65) **Investigations on the transient version of URANUS.** Kaltenthaler, G. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

Fundamental studies on the treatment of non-steady-state heat conduction are presented.

43926 (KFK—3325, pp 66-71) **Use of the URANUS code at Karlsruhe Nuclear Research Center.** Lassmann, K. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

The URANUS code has become a standard code at Karlsruhe Nuclear Research Center, e.g. in the CABRI, MOL 7C, and other projects. All development activities are discussed in detail between KFK and IRT. Cooperation so far has been smooth and fruitful and should be continued.

43927 (KFK—3382) **Accident consequences and risk assessments based on the probabilistic safety study of a nuclear power plant with a high temperature reactor (HTR-1160).** Ehrhardt, J.; Bayer, A.; Kroeger, W.; Schwarzer, K. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik). Sep 1982. 77p. (In German). (Juel-Spez—157). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750203.

Starting with the results of the probabilistic safety study of a nuclear power plant with a HTR-1160, accident consequences and risk assessments have been performed for the site location Schmehausen near Hamm (FRG). The calculations were accomplished using the accident consequence model of the German Risk Study (version UFOMOD/B3), which was modified with respect to (1) the longer duration of releases compared with LWR (2) the application to a single site and (3) essential scientific findings became known since the conception of the first accident consequence models. The accident consequence assessments showed that no early fatalities (death due to accute radiation syndrome) will occur. Late fatalities (death from leukemia and cancer) were estimated at all release categories due to the applied linear dose-risk relationship. The dominating exposure pathway was evaluated to be the internal exposure by ingested radioactivity. The overwhelming part of late fatalities was calculated from radiation doses below the dose limits of the German Radiation Protection Law (paragraph 28(3)). The collective risk (product of mean collective damage and frequency) was assessed to be - dependent on the plant concept - 0.35/a and 0.028/a respectively.

43928 (KFK—3426) **Investigations by model theory of fast breeder reactor fuel pins and application to special safety experiments.** Preusser, T. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter; Technische Hochschule Darmstadt (Germany, F.R.). Fachgebiet Reaktortechnik). Dec 1982. 164p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750915.

Thesis.

This paper makes a contribution to the development of the fuel rod model theory for describing transient loads up to and including very fast accidents. In three successive sections the state of knowledge is subjected to critical discussion, improvements are presented and, finally, possibilities of application indicated by the example of experiment analysis. Within the framework of further developments a consistent compilation is given of all relevant material data for describing UC and (U, Pu) C-fuels and models are derived on the fission gas behavior and on swelling. A literature search is made on the restructuring of oxide fuels and it is shown above all with respect to transient calculations which models can be employed here.

43929 (ND-R—610(a)) **PWR degraded core analysis.** Gittus, J.H. (UKAEA Risley Nuclear Power Development Establishment). Apr 1982. 566p. NTIS (US Sales Only), PC A24/MF A01. Order Number DE83701804.

A review is presented of the various phenomena involved in degraded core accidents and the ensuing transport of fission products from the fuel to the primary circuit and the containment. The dominant accident sequences found in the PWR risk studies published to date are briefly described. Then chapters deal with the following topics: the condition and behaviour of water reactor fuel during normal operation and at the commencement of degraded core accidents; the generation of hydrogen from the Zircaloy-steam and the steel-steam reactions; the way in which the core deforms and finally melts following loss of coolant; debris relocation analysis; containment integrity; fission product behaviour during a degraded core accident.

43930 (NUREG—0824-Final) **Integrated Plant Safety Assessment: Systematic Evaluation Program. Millstone Nuclear Power Station, Unit 1, Northeast Nuclear Energy Company, Docket No. 50-245. Final report.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Feb 1983. 542p. NTIS, PC A23/MF A01 - GPO $12.00. Order Number DE83901892.

Portions are illegible in microfiche products.

This report documents the review of the Millstone Nuclear Power Station, Unit 1, operated by Northeast Nuclear Energy Company (located in Waterford, Connecticut). Millstone Nuclear Power Station, Unit 1, is one of ten plants reviewed under Phase II of this program. This report indicates how 137 topics selected for review under Phase I of the program were addressed. Equipment and procedural changes have been identified as a result of the review. It is expected that this report will be one of the bases in considering the issuance of a full-term operating license in place of the existing provisional operating license. This report also addresses the comments and recommendations made by the Advisory Committee on Reactor Safeguards in connection with its review of the Draft Report, issued in November 1982.

43931 (NUREG—0825-Final) **Integrated Plant Safety Assessment: Systematic Evaluation Program. Yankee Nuclear Power Station, Yankee Atomic Electric Company, Docket No. 50-29. Final report.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jun 1983. 598p. NTIS, PC A25/MF A01 - GPO $11.00. Order Number DE83902871.

Portions are illegible in microfiche products.

The Systematic Evaluation program was initiated in February 1977 by the US Nuclear Regulatory Commission to review the designs of older operating nuclear reactor plants to confirm and document their safety. The review provides: (1) an assessment of how these plants compare with current licensing safety requirements relating to selected issues, (2) a basis for deciding on how these differences should be resolved in an integrated plant review, and (3) a documented evaluation of plant safety. This report documents the review of Yankee Nuclear Power Station, operated by Yankee Atomic Electric Company. The Yankee plant is one of 10 plants reviewed under Phase II of this program. This report indicates how 137 topics selected for review under Phase I of the program were addressed. Equipment and procedural changes have been identified as a result of the review.

43932 (NUREG—0826-Final) **Integrated Plant Safety Assessment: Systematic Evaluation Program. Haddam Neck Plant, Connecticut Yankee Atomic Power Company, Docket No. 50-213. Final report.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). 1983. 665p. NTIS, PC A99/MF A01 - GPO $11.00. Order Number DE83902890.

Portions are illegible in microfiche products.

The Systematic Evaluation Progam was initiated in February 1977 by the US Nuclear Regulatory Commission review the designs of older operating nuclear reactor plants to confirm and document their safety. The review provides: (1) an assessment of how these plants compare with curent licensing safety requirements relating to selected issues, (2) a basis for deciding on how these differences should be resolved in an integrated plant review, and (3) a documented evaluation of plant safety. This report documents the review of Haddam Neck Plant, operated by Connecticut Yankee Atomic Power Company. The Haddam Neck Plant is one of 10 plants reviewed under Phase II of this program. This report indicates how 137 topics selected for review under Phase I of the program were addressed. Equipment and procedural changes have been identified as a result of the review.

43933 **(NUREG—0896-Suppl.2) Safety-evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation). Jun 1983. 19p. NTIS, PC A02/MF A01 - GPO $3.25. Order Number DE83902853.

This report is Supplement 2 to the Safety Evaluation Report (NUREG-0896, March 1983) for the application filed by the Public Service Company of New Hampshire, et al., for licenses to operate Seabrook Station, Units 1 and 2 (Docket Nos. STN 50-443 and STN 50-444). It has been prepared by the Office of Nuclear Reactor Regulation of the US Nuclear Regulatory Commission and provides recent information on open items identified in the SER. The facility is located in Seabrook, New Hampshire. Subject to favorable resolution of the items discussed in this report, the staff concludes that the facility can be operated by the applicant without endangering the health and safety of the public.

43934 **(NUREG/CR—2000-Vol.2-No.6) Licensee Event Report (LER) compilation for month of June 1983.** (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 94p. (ORNL/NSIC—200-Vol.2.No.6). NTIS, PC A05/MF A01 - GPO. Order Number DE83015183.

This monthly report contains Licensee Event Report (LER) operational information that was processed into the LER data file of the Nuclear Safety Information Center (NSIC) during the one month period identified on the cover of the document. The LER summaries in this report are arranged alphabetically by facility name and then chronologically by event date for each facility. Component, system, keyword, and component vendor indexes follow the summaries. The components, systems, and vendors are those identified by the utility when the LER form is initiated; the keywords are assigned by the computer using correlation tables from the Sequence Coding and Search System.

43935 **(NUREG/CR—2475) Hydrogen combustion characteristics related to reactor accidents.** Berlad, A.L.; Sibulkin, M.; Yang, C.H. (Brookhaven National Lab., Upton, NY (USA)). Jul 1983. Contract AC02-76CH00016. 42p. (BNL-NUREG—51492). NTIS, PC A03/MF A01 - GPO $3.75. Order Number DE83014967.

A knowledge of combustion phenomena and their characteristics is necessary in accident analyses related to the release of hydrogen. As a result of the accident at Three Mile Island, and from the results of related studies of hypothetical degraded core accidents, it is recognized that combustion of hydrogen may, under some circumstances, threaten the integrity of a reactor containment building. This report attempts to provide a perspective on combustion processes which may not otherwise be derived easily from the enormously diverse combustion literature.

43936 **(NUREG/CR—2595) General approach to assure compliance with ALARA guidelines on direct radiation from a nuclear power plant, January 1979-January 1982.** Harding, W.; Silver, C. (Drexel Univ., Philadelphia, PA (USA). Environmental Studies Inst.). Jun 1983. 131p. NTIS, PC A07/MF A01 - GPO $5.00. Order Number DE83902531.

Nuclear Regulatory Commission guide lines specify 10 mrad per reactor as the total yearly direct (gamma) radiation dose at any point external to a nuclear power facility site boundary. Typically a nuclear utility submits only thermoluminescence dosimetry (TLD) data unaccompanied by corresponding core sample, ion chamber or other data or analyses to demonstrate compliance. This study considers a standard approach for analyzing the TLD data in terms of semiempirical physical constructs which allow the use of correlations among certain preoperational TLD data to predict or model operational period TLD measures (expected values) in the absence of the source (nuclear facility). These apriori models depend only upon their fit to the observed nonimpacted data for their verification. They are not veridical. The models are used to analyze a $CaSO_4$ (TM) thermoluminescence dosimetry system set up in a matrix about the nuclear plant and which records the terrestrial and cosmic radiation background as well as the nuclear plant contribution.

43937 **(NUREG/CR—2599) Experiment operations plan for the MT-3 experiment in the NRU reactor.** Russcher, G.E.; Wilson, C.L.; Parchen, L.J.; Freshley, M.D. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76RL01830. 36p. (PNL—4190). NTIS (US Sales Only), PC A03/MF A01 - GPO $3.75. Order Number DE83015435.

A series of thermal-hydraulic and cladding-materials deformation experiments were conducted using light-weight reactor fuel bundles as part of the Pacific Northwest Laboratory Loss-of-Coolant Accident (LOCA) Simulation Program. This report is the formal operations plan for MT-3 - the third cladding-materials deformation experiment conducted in the National Research Universal (NRU) reactor, Chalk River, Ontario, Canada. The major objective of MT-3 was to simulate a pressurized-water-reactor LOCA that could induce fuel-rod cladding deformation and rupture.

43938 **(NUREG/CR—2843/3) Thermal/Hydraulic Analysis Research Program. Quarterly report, July-September 1982.** Thompson, S.L. (Sandia National Labs., Albuquerque, NM (USA)). Mar 1983. Contract AC04-76DP00789. 80p. (SAND—82-1788-Vol.3). NTIS, PC A05/MF A01 - GPO. Order Number DE83013694.

Portions are illegible in microfiche products.

During this quarter, the RALOC assessment effort was directed toward comparing the results of single blind analyses for two standard problems on hydrogen mixing and distribution, which were performed last quarter, with the experimental data. The standard problems were based on the EPRI-sponsored steam/hydrogen and steam/helium injection tests performed at the Hanford Engineering Development Laboratory (HEDL) for the Electric Power Research Institute (EPRI). The two tests analyzed were a steam/hydrogen injection test in which the injection was performed with a horizontal nozzle (Test A) and a steam/helium injection test in which the injection was performed with a vertical nozzle (Test B).

43939 **(NUREG/CR—2915(83)) Initial guidance on digraph-matrix analysis for systems interaction studies.** Alesso, H.P.; Sacks, I.J.; Smith, C.F. (Lawrence Livermore National Lab., CA (USA)). Mar 1983. Contract W-7405-ENG-48. 60p. (UCID—19457). NTIS, PC A04/MF A01; - GPO $4.75. Order Number DE83009775.

This report describes the digraph-matrix analysis for systems structural analysis. The method is useful to analysts that are searching for both single failures and paired failures that disable systems. The digraph-matrix analysis can assure the analyst that the independent functioning of a safety system is not jeopardized by design features that cause faults to be dependent. The digraph-matrix analysis facilitates the discovery and the quantification of component reachability. The guidance is sufficiently specific that the reader can make direct application. Because a systems interaction analysis of an LWR is expensive, the resource efficiency of a candidate method is important to the staff. A demonstration of the digraph-matrix analysis is part of the staffs efforts to provide a measure of its resource efficiency. Additionally, there are features within the digraph-matrix analysis itself that might be modified to enhance resource efficiency.

43940 **(NUREG/CR—3175) Institutional implications of establishing safety goals for nuclear power plants.** Morris, F.A.; Hooper, R.L. (Battelle Human Affairs Research Center, Seattle, WA (USA); Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 63p. (PNL—4641). NTIS, PC A04/MF A01 - GPO $4.50. Order Number DE83015663.

The purpose of this project is to anticipate and address institutional problems that may arise from the adoption of NRC's proposed Policy Statement on Safety Goals for Nuclear Power Plants. The report emphasizes one particular category of institutional problems: the possible use of safety goals as a basis for legal challenges to NRC actions, and the resolution of such challenges by the courts. Three types of legal issues are identified and analyzed. These are, first, general legal issues such as access to the legal system, burden of proof, and standard of proof. Second is the particular formulation of goals. Involved here are such questions as

sustainable rationale, definitions, avoided issues, vagueness of time and space details, and degree of conservatism. Implementation brings up the third set of issues which include interpretation and application, linkage to probabilistic risk assessment, consequences as compared to events, and the use of results.

43941 **(NUREG/CR—3241) Probabilistic methods for identification of significant accident sequences in loop-type LMFBRs.** Jamali, K.M.A. (Brookhaven National Lab., Upton, NY (USA)). Jun 1983. Contract AC02-76CH00016. 326p. (BNL-NUREG—51664). NTIS MF A01 - GPO. Order Number DE83015644.

Microfiche only, copy does not permit paper copy reproduction.

The aim of the Probabilistic Accident Progression Analysis (PAPA) described herein is to establish a framework for better use of the probability measure; first, as a basis for deterministic calculations, and second, as a part of a comprehensive method for risk assessment in its own right. The achievement of this goal rests on: (1) improvements in the existing approaches for acquisition and analysis of accident sequences; (2) defining a new measure of probabilistic importance that aids in the ranking of sequences of highly uncertain events; and (3) implementation of new techniques for quantification of dependent failures of similar components. The existing techniques related to the above three topics are discussed and the state of the art is reviewed. The PAPA approach is described. The techniques of PAPA are applied to a class of Protected Transients (transients in which the reactor is successfully shutdown) in the Clinch River Breeder Reactor Plant (CRBRP). The results of the application of these techniques are described.

43942 **(NUREG/CR—3278) Hydrogen-burn analyses of ice-condenser containments.** Gido, R.G.; Koestel, A. (Los Alamos National Lab., NM (USA)). Jul 1983. Contract AC06-76RL01830. 118p. (LA—9749-MS). NTIS, PC A06/MF A01 - GPO $5.00. Order Number DE83015661.

Portions are illegible in microfiche products.

Predicted are the Sequoyah and McGuire ice-condenser-containment atmosphere pressure ad temperature responses during degraded-core accidents that involve the release and combustion of large quantities of hydrogen. Predictions are based on (1) an appropriately modified version of the US Nuclear Regulatory Commission (NRC) subcompartment analysis code COMPARE and (2) a Burning-Lean-with-Turbulence model for the estimation of burn parameters. The COMPARE code modifications are described. Also, COMPARE-calculated results are compared with utility-calculated results submitted to the NRC.

43943 **(NUREG/CR—3283) First-excursion problems for Gaussian vector processes.** Kako, T.; Shinozuka, M.; Tsurui, A. (Columbia Univ., New York (USA). Dept. of Civil Engineering and Engineering Mechanics). Apr 1983. Contract AC02-76CH00016. 64p. (BNL-NUREG—51672). NTIS, PC A04/MF A01 - GPO. Order Number DE83015643.

The use of more sophisticated load and structural models is increasingly demanded in order to reflect the effects of load-structure interaction more realistically in structural reliability analysis, particularly when dealing with such risk-sensitive systems as nuclear power plant structures. Under the assumptions that the linear structural response analysis is acceptable and that the underlying random processes are Gaussian, the present study demonstrates (1) how a structural reliability analysis can accommodate some of the more realistic limit state conditions, particularly hyper-polyhedral and hyper-spherical limit state conditions in terms of stress, (2) how a finite element analysis can be incorporated into the reliability analysis to be performed under these limit state conditions, and (3) how the random process idealization of loading conditions can be used in the dynamic structural reliability analysis in conjunction with such limit state conditions, by taking the earthquake ground acceleration process as an example.

43944 **(NUREG/CR—3315) Consensus estimation study of nuclear power plant structural loads.** Hwang, H.; Wang, P.C.; Shooman, M.; Reich, M. (Brookhaven National Lab., Upton, NY (USA)). May 1983. Contract AC02-76CH00016. 312p. (BNL-NUREG—51678). NTIS, PC A14/MF A01 - GPO. Order Number DE83015645.

Portions are illegible in microfiche products.

For safety evaluation of seismic category I nuclear structures, probabilistic characteristics of the actual loads acting on the structures are needed. A study was conducted to determine the probabilistic characteristics of the operational and accidental loads using the consensus estimation technique. A study committee on nuclear power plant stuctural loads was formed and experts in the nucelar industry were invited to participate. The consensus study was carried out using two round of questionnaires. The responses to the second round questionnaire were statistically evaluated and the results are documented in this report. The results are judged to be tentative because of the limited numbers of responses for each category of the load surveyed. Since very little probabilistic load data exists in the literature, the consensus study results supplemented with judgements should be of considerable value in the probability-based reliability analysis of nuclear structures.

43945 **(NUREG/CR—3359-Vol.1) Physics of reactor safety. Quarterly report, January-March 1983.** (Argonne National Lab., IL (USA)). May 1983. Contract W-31-109-ENG-38. 49p. (ANL—83-11-Vol.1). NTIS, PC A03/MF A01. Order Number DE83015044.

Portions are illegible in microfiche products.

This quarterly progress report summarizes work done during the months of January-March 1983 in Argonne National Laboratory's Applied Physics and Components Technology Divisions for the Division of Reactor Safety Research of the US Nuclear Regulatory Commission. The work in the Applied Physics Division includes reports on reactor safety modeling and assessment by members of the Reactor Safety Appraisals Section. Work on reactor core thermal-hydraulics is performed in ANL's Components Technology Division, emphasizing 3-dimensional code development for LMFBR accidents under natural convection conditions. An executive summary is provided including a statement of the findings and recommendations of the report.

43946 **(OEFZS—4154) LWR loss of coolant accidents and conservatism in the anticipated release of iodine.** Komurka, M. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H., Vienna). Mar 1982. 22p. (In German). (RS—199/82). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702073.

This report addresses the potential LWR accident source term implication on accident evaluation assuming a change of the chemical form of iodine from elemental to cesium iodide. As a consequence, the escape of iodine to the environment and the risk to the general public presented by iodine is much lower than estimated.

43947 **(ORAU/IEA—83-7(M)) Safety considerations for light-water-reactor nuclear power plants: a Swedish perspective.** Tiren, I. (Oak Ridge Associated Universities, Inc., TN (USA)). May 1983. Contract AC05-76OR00033. 40p. NTIS, PC A03/MF A01. Order Number DE83015638.

This paper gives an overview of nuclear safety development in Sweden during the last decade. The perspective is that of ASEA-ATOM, the domestic BWR vendor. A brief outline is given of the nuclear debate, political maneuvering, and official investigations before the national referendum on nuclear power held in 1980. The referendum was a direct consequence of TMI, and the outcome implies retention of the current program of twelve Swedish reactors with a dim future for any further expansion. The main part of the paper deals with safety criteria applied to the BWRs in Sweden and Finland and the safety characteristics of these plants. A description of design features and accounts of safety analyses and reviews are given, including risk studies conducted within the framework of governmental commissions.

43948 **(PNL-SA—9729) Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation.** Moeller, M.P.; Desrosiers, A.E. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1981. Contract AC06-76RL01830. 8p. (CONF-811103—131). NTIS, PC A02/MF A01. Order Number DE83015093.

From ANS winter meeting; San Francisco, CA, USA (29 Nov 1981).

Portions are illegible in microfiche products.

An analysis of the population density as a function of radial distance during an emergency evacuation identifies several significant contributors to evacuation time. Population distribution and density, as well as the location of high population density centers, are critical to evacuation time. A thorough understanding of the population characteristics of an EPZ and their effect on evacuation time is necessary if emergency planners are to select the best method of evacuation.

43949 (PNL-SA—9992) Nuclear power attitude trends. Nealey, S.M. (Pacific Northwest Lab., Richland, WA (USA)). Nov 1981. Contract AC06-76RL01830. 4p. (CONF-811103—130). NTIS, PC A02/MF A01. Order Number DE83015075.

From ANS winter meeting; San Francisco, CA, USA (29 Nov 1981).

The increasing vulnerability of nuclear power to political pressures fueled by public concerns, particularly about nuclear plant safety and radioactive waste disposal, has become obvious. Since Eisenhower's Atoms-for-Peace program, utility and government plans have centered on expansion of nuclear power generating capability. While supporters have outnumbered opponents of nuclear power expansion for many years, in the wake of the Three Mile Island (TMI) accident the margin of support has narrowed. The purpose of this paper is to report and put in perspective these long-term attitude trends.

43950 (SAND—83-0443C) Evaluation of severe accident safety system value based on averting financial risks. Hatch, S.W.; Bennett, P.R.; Benjamin, A.S. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 10p. (CONF-830816—5). NTIS, PC A02/MF A01. Order Number DE83015208.

From International meeting on light-water reactor severe accident evaluation; Cambridge, MA, USA (28 Aug 1983).

The Severe Accident Risk Reduction Program is being performed to benchmark the risks from nuclear power plants and to assess the benefits and impacts of a set of severe accident safety features. This paper describes the program in general and presents some preliminary results. These results include estimates of the financial risks associated with the operation of six reference plants and the value of severe accident prevention and mitigation safety systems in averting these risks. The results represent initial calculations and will be iterated before being used to support NRC decisions.

43951 (SAND—83-1192) Light-Water-Reactor Safety-Technology Program. Quarterly report, January-March 1983. (Sandia National Labs., Albuquerque, NM (USA)). May 1983. Contract AC04-76DP00789. 30p. NTIS, PC A03/MF A01. Order Number DE83014791.

Information is presented concerning risk methods utilization; man-machine interaction; safety data; utility training; information systems; and integrated approach demonstration.

43952 (UCRL—86245) Probability problems in seismic risk analysis and load combinations for nuclear power plants. George, L.L. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 16p. (CONF-830889—1). NTIS, PC A02/MF A01. Order Number DE83014845.

From NATO Advanced Study Institute on statistical extremes and applications; Vimeiro, Portugal (31 Aug 1983).

This workshop describes some probability problems in power plant reliability and maintenance analysis. The problems are seismic risk analysis, loss of load probability, load combinations, and load sharing. The seismic risk problem is to compute power plant reliability given an earthquake and the resulting risk. Component survival occurs if its peak random response to the earthquake does not exceed its strength. Power plant survival is a complicated Boolean function of component failures and survivals. The responses and strengths of components are dependent random processes, and the peak responses are maxima of random processes. The resulting risk is the expected cost of power plant failure.

43953 (UFRJ-COPPE-PEN—114) Probabilistic safety analysis : a new nuclear power plants licensing method. de Oliveira, L.F.S. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia). Apr 1982. 45p. (In Portuguese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702142.

After a brief retrospect of the application of Probabilistic Safety Analysis in the nuclear field, the basic differences between the deterministic licensing method, currently in use, and the probabilistic method are explained. Next, the two main proposals (by the AIF and the ACRS) concerning the establishment of the so-called quantitative safety goals (or simply 'safety goals') are separately presented and afterwards compared in their most fundamental aspects. Finally, some recent applications and future possibilities are discussed.

43954 High temperature measuring device. Tokarz, R.D. (to Dept. of Energy). US Patent 4,386,049. 31 May 1983. Filed date 29 Jan 1981. vp.

PAT-APPL-229497.

A temperature measuring device for very high design temperatures (to 2,000°C). The device comprises a homogenous base structure preferably in the form of a sphere or cylinder. The base structure contains a large number of individual walled cells. The base structure has a decreasing coefficient of elasticity within the temperature range being monitored. A predetermined quantity of inert gas is confined within each cell. The cells are dimensionally stable at the normal working temperature of the device. Increases in gaseous pressure within the cells will permanently deform the cell walls at temperatures within the high temperature range to be measured. Such deformation can be correlated to temperature by calibrating similarly constructed devices under known time and temperature conditions.

43955 Assistance to operators of nuclear power plants in Europe in emergency situations. Volta, G. (Commission of the European Communities, Ispra, Italy). pp 1415-1424 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

After the TMI accident the Joint Research Centre of the Commission of the European Communities, in the framework of its Safety Research Programme, prepared a Status Report to answer the question: "What is the situation in Europe as concerns the assistance to operators to enable them to recognize the significance of abnormal plant behaviour and to take the proper actions to put the plant in a safe condition?" The report has been prepared in the period January 1980 - June 1981, based upon workshops and topical studies.The report covers the following subjects: selection, training, Qualification, Licensing and Staffing of Reactor Operating Personnel, with specific reference to simulator training and emergency procedures; present control room design; advanced control room design and associated research; post-accident crises and their management; practice and trends in non-nuclear industry. The paper highlights the main results as concerns operators' qualification and training, control room design and development in the area of diagnostic approaches to assist operators.

43956 The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory. Knee, H.E. (Oak Ridge National Lab., TN); Haas, P.M.; Siegel, A.I. pp 1425-1431 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Human errors committed during maintenance activities are potentially a major contribution to the overall risk associated with the operation of a nuclear power plant (NPP). An NRC-sponsored program at Oak Ridge National Laboratory is attempting to develop a quantitative predictive technique to evaluate the contribution of maintenance errors to the overall NPP risk. The current work includes a survey of the requirements of potential users to ascertain the need for and content of the proposed quantitative model, plus an initial job/task analysis to determine the scope and applicability

of various maintenance tasks. In addition, existing human reliability prediction models are being reviewed and assessed with respect to their applicability to NPP maintenance tasks. This paper discusses the status of the program and summarizes the results to date.

43957 **System reliability engineering in the Swedish nuclear regulatory process.** Lydell, B.O.Y. (Swedish Nuclear Power Inspectorate, Stockholm). pp 1087-1093 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

The needs for prospective and retrospective system reliability analyses of nuclear power plants have been discussed by numerous authorities during the past decade. In particular it was the accident at Three Mile Island Unit 2 that initiated a concerted reliability evaluation effort within the nuclear community. A critical review of present applications of reliability technology is presented in the paper. A brief outline of present and future applications of system reliability engineering techniques in the Swedish regulatory process is presented as well.

43958 **Applications of PRA in licensing.** El-Bassioni, A.; Israel, S.; Lakner, A.; Thadani, A. (U.S. Nuclear Regulatory Commission, Washington, DC). pp 1094-1101 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

The NRC has used PRA techniques as an adjunct to making regulatory assessments in the aftermath of the TMI-2 accident. Results of studies on switchover from injection to recirculation following a LOCA, BWR scram discharge volume pipe failure, auxiliary feedwater system reliability, and the relative frequency of core damage (only) events are presented to indicate the type of impact this effort has had on the licensing process.

43959 **Generic nuclear safety issues: methods and examples.** Heising, C.D. (Massachusetts Inst. of Tech., Cambridge, MA). pp 1102-1111 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Methods for analyzing generic nuclear safety issues related to nuclear power plant licensing are described. An example is given of a particular application to estimating the reactor core melt frequency including the experience gained at Three Mile Island. Using a Bayesian approach, the results indicate that commercial reactor operating experience to date which accounts for the possibility of core meltdown at Browns Ferry and Three Mile Island does not shift the estimate of WASH-1400 significantly. This example should provide guidance to those involved in the licensing process who wish to apply PRA methods to problems they face.

43960 **Quantitative software reliability analysis in nuclear safety.** Komoriya, H.; Mueller, C.J.; Morris, E.E. (Argonne National Lab., Argonne, IL). pp 1112-1123 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

This paper describes the results of the initial phase of a research program sponsored by the Nuclear Regulatory Commission (NRC) that is designed to establish quantitative predictions of reliability for the computer software used in the nuclear industry. In this inital phase, models used in evaluating software in the defense, aerospace, and communications industries have been applied to common software failure data bases for comparison and evaluation. The results of these studies, discussions of the model highlights and deficiencies and an assessment of the role that these models can play in assessing codes relevant to nuclear safety are presented herein.

43961 **Sandia nuclear power plant siting study.** Strip, D.R.; Aldrich, D.C.; Alpert, D.J.; Ostmeyer, R.M.; Sprung, J.L. (Sandia National Lab., Albuquerque, NM). pp 1131-1140 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

NRC's Siting Analysis Branch requested Sandia National Laboratories to provide technical guidance for establishing (1) numerical criteria for population density and distribution surrounding future nuclear power plant sites and (2) standoff distances from plants for offsite hazards. The first task involved analyses in four areas, each of which could play a role in evaluating the impact of a siting policy. The four areas were risks from possible plant accidents, population distribution characteristics for existing sites, availability of sites, and socioeconomic impacts. The second task had two areas of concern: determination of which classes of offsite hazards are amenable to regulation by fixed standoff distances, and review of available models for the determination of appropriate standoff distances. Results, conclusions, and recommendations of the study are summarized.

43962 **Applications of nuclear accident consequence models.** Bayer, A. (Kernforschungszentrum Karlsruhe, Federal Republic of Germany). pp 1153-1162 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

Nuclear accident consequence models have been developed to describe the transport and dispersion of released radioactive materials, and to predict the resulting interaction with and influence on the environment and man. Examples of such models are CRAC and UFOMOD which were developed as part of the American Reactor Safety Study and the German Risk Study, respectively. In addition to their use in risk evaluation, however, accident consequence models provide a useful tool for planning and decision making. These areas of potential application include: evaluation of alternative design features, emergency planning and response, reactor siting recommendations, and development of acceptable risk criteria. In addition, key problems in performing these applications, such as treatment of uncertainties, are discussed.

43963 **Probabilistic approach in selecting the serviced area for public radiation alarm systems in the vicinity of nuclear power plants.** Jacobi, A. Jr. (Electrowatt Engineering Services Ltd., Zurich, Switzerland). pp 1177-1185 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

The introduction of Public Radiation Alarm Systems (PRAS) and of emergency preparedness plans are becoming mandatory for areas close to nuclear power plants (NPP). These could help to substantially limit consequences to the public from severe but very unlikely nuclear accidents. An important question that has to be resolved before implementing such emergency plans is the determination of the area limits to be served by a PRAS. This paper gives first a brief overview of aspects and parameters having an influence when establishing the zones where a PRAS is to be installed. Second, it shows how area boundaries could be selected based on probabilistic techniques. Finally, it summarizes the results of a corresponding probabilistic assessment for a projected NPP for which recommendations for PRAS zones had to be elaborated.

43964 **The sensitivity of calculated doses to critical assumptions for the offsite consequences of nuclear power reactor accidents.** Moeller, M.P.; Scherpelz, R.I.; Desrosiers, A.E. (Pacific Northwest Lab., Richland, WA). pp 1207-1215 of Probabilistic risk assessment. La Grange Park, IL; American Nuclear Society, Inc. (1982). (CONF-810905—).

From ANS/ENS topical meeting on probabilistic risk assessment; Port Chester, NY, USA (20 Sep 1981).

This work analyzes the sensitivity of calculated doses to critical assumptions for offsite consequences following a PWR-2 accident at a nuclear power reactor. The calculations include three

radiation dose pathways: internal dose resulting from inhalation, external doses from exposure to the plume, and external doses from exposure to contaminated ground. The critical parameters are the time period of integration for internal dose commitment and the duration of residence on contaminated ground. The data indicate the calculated offsite whole body dose will vary by as much as 600% depending upon the parameters assumed. When offsite radiation doses determine the size of emergency planning zones, this uncertainty has significant effect upon the resources allocated to emergency preparedness.

43965 **Secondary emissions from secondary loop of light-water reactors in normal operation and during selected incidents.** Heidelberg, Germany; Institut fuer Energie- und Umweltforschung e.V. (1982). 256p. (In German). Fachinformationszentrum Energie, Physik, Mathematik, Karlsruhe, Germany, F.R.

In order to quantify the nuclide specific emissions from the secondary loop of light water reactors during normal operation and as a result of selected incidents the computer program SEKEM4 was developed. The program is based upon a transport model, which describes the nuclide specific activity transport of fission and activation products from the primary loop through the secondary loop to the environment (air pathway). The program was tested with the aid of a sensitivity analysis, and the effect of parameter changes on emission rates was compared. In connection with the analysis of the transport phenomenon involved it was observed that not only the residual humidity transport but also the nuclide transport in the steam phase must be considered. The development of a detailed phase distribution model, which integrates commonly used formulas, has taken this factor into account. Within the frame of the secondary system model a previously unnoticed transport path was considered and its impact on the emission rate of the secondary loop was determined.

43966 **Fracture mechanics evaluation of reactor piping reliability. Pt. 2. Simulation of pipe rupture probability.** Lim, E.Y.; Basin, S.L. (Science Applications, Inc., Palo Alto, CA (USA)); George, L.L. (California Univ., Livermore (USA). Lawrence Livermore National Lab.); Iglehart, D.L. (Stanford Univ., CA (USA). Dept. of Operations Research). pp M12/3 of Structural mechanics in reactor technology. Vol. M. Methods for structural analysis. Amsterdam, Netherlands; North-Holland Publishing Co. (1981). (CONF-810801—Vol.M).

From 6. international conference on structural mechanics in reactor technology; Paris, France (17 Aug 1981).

This paper describes simulation of fatigue crack growth of fabricated cracks in welds due to transients and earthquakes and the combination of the single weld joint simulations to estimate primary coolant loop pipe fracture probability. It also gives a sensitivity measure, the derivative of the probability with respect to input variables, and constructs a confidence interval on the probability. The fatigue crack growth model is in SMiRT-6 paper M 12/2. Deterministic computation of pipe fracture probability requires conservative assumptions. To avoid conservative assumptions, we simulated pipe fracture in welds. To obtain accurate estimates of pipe fracture probability, we used stratified sampling.

43967 **(UCRL-Trans—11695) Analytical investigation concerning condensation of steam with low air content.** Schweiger, W.; Schwinges, B. (Lawrence Livermore National Lab., CA (USA); Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Koeln (Germany, F.R.)). 1980. Contract W-7405-ENG-48. Translation of GRS-A-520, November 1980. 47p. NTIS, PC A03. Order Number DE81027177.

Paper copy only, copy does not permit microfiche production.

This report developed under subcontract 72610 of the research program RS 263/6 describes some improvements of an advanced chugging model. Basically the chugging model consists of a thermomechanical single node model which additionally contains the effects of steam-pool-interface turbulence and the socalled spontaneous condensations. The essential result up to now is that the steam flow in the condensation pipe can be approximated by an unsteady incompressible flow and the volume of the entire condensation pipe together with the bubble volume can be simulated as one nodal volume.

25 ENERGY STORAGE

43968 **(BEOP—14) Review of energy storage.** van Mourik, G.J. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1982. 20p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

A review of energy storage in different countries has been briefly described. An inventory of energy storage in relation to different energy sources has been given, such as electrical, chemical, mechanical and thermal energy. A classification of energy storage in relation to size has been made: on a national level, a regional level, a city level, a district level, for the construction of buildings and houses.

2501 Magnetic

REFER ALSO TO CITATION(S) 45229, 45230

2504 Capacitor Banks

REFER ALSO TO CITATION(S) 45231

43969 **Protection of large capacitor banks.** Sprott, J.C.; Lovell, T.W. (Department of Physics, University of Wisconsin, Madison, Wisconsin 53706). *Review of Scientific Instruments;* **54**: No. 7, 896-897(Jul 1983).

Large capacitor banks, as used in many pulsed plasma experiments, are subject to catastrophic failure in the event of a short in the output or in an individual capacitor. Methods are described for minimizing the damage and down time caused by such a failure.

2505 Flywheels

REFER ALSO TO CITATION(S) 44010

43970 **(ESC—1) Proposed coordinated research program of energy storage in flywheels. Project preparation group 'Flywheels'.** van Zanten, M. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). May 1977. 119p. (In Dutch). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770217.

Portions are illegible in microfiche products.

Technical and economic aspects of energy storage are surveyed. It is concluded that application of mechanic and electric energy storage in the Netherlands is primarily restricted to electric power generation and to transportation. For both applications advanced batteries and flywheels turned out to be the main candidates for small to medium storage capacities. A comparison of flywheel systems and advanced batteries shows that flywheels have a number of advantages, i.e. high round trip efficiency, large number of cycles, temperature independence, high discharge depth and (dis)charge speed. Moreover the industrial and scientific knowhow and competence in the Netherlands may favour an R and D programme on flywheels. Based on this view the proposed programme consists of two lines of approach. The first line concerns the integration of a commercial flywheel system within 5 years at different places in the electric network system. The cost of this development is estimated at Hfl 17,000,000. The programme will be executed by several companies, including the electric power industry, and will be managed by ECN. The second line of approach concerns an advanced flywheel programme consisting of optimisation of flywheel design and materials. It also comprises a systems analysis of the different aspects of energy storage in the Netherlands in relation to different conversion systems such as wind energy, total energy systems, combined heat and power supply, and solar energy. It is pro-

posed to carry out the first phase of the development programme, for which Hfl 850,000 is required.

2506 Thermal

43971 **(BMFT-FB-T—83-074) Large-scale thermal storage systems.** Jank, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). May 1983. 53p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83751042.

A review on the state of the art in the field of large-scale thermal energy storage concepts, developed in the countries of W. Germany, Sweden, Switzerland, Denmark, United States of America is given. The possibilities of operation of large-scale thermal stores with district heating systems are discussed. The report is to be seen as a review of work done within the frame of the International Energy Agency under the Implementing Agreement of a number of participating countries for the German contactor.

43972 **(NE/FBA—82-14) Solubility of rocks and minerals in hot water. The chemical changes of water on heat storage in caverns.** Ronge, B.; Claesson, T. (Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)). Apr 1982. 146p. (In Swedish). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750775.

Portions are illegible in microfiche products.

The paper is final report on water-rock interaction in the temperature range 50-150 degrees C and pressures up to 0.6 mPa. For most rock forming minerals, except the carbonate group, there is an increase of solubility due to increasing pressure and temperature. The laboratory tests included rock and mineral samples consisting of thin rock slices having an exposed surface area of 150 cm^2. Ten samples each of alkaligranite, granite, granodiorite, gabbro and sedimentary gneiss have been tested parallelly. The most abundant minerals in the different rock types were tested separately. These minerals are quartz, alkalifeldspar, albite, labradorite, biotite, muskovite, augite and hornblende. The following points are of main importance. - The species in the water phase after treatment in autocalves are Si, Na, K, Ca an Al. - The initial water should have a pH value in between 7.5-8. - The weathering products on the mineral surfaces are clay minerals, aluminium hydroxides and hydroxides of iron and magnesium. - Micas remain relatively stable during the reactions. - Iron-magnesium silicates form a brownish surface known as iddingsite.

43973 **(PNL-SA—10738) Determination of important physicochemical processes at an aquifer thermal-energy-storage site in Minnesota using both laboratory and field techniques.** Blair, S.C.; Deutsch, W.J. (Pacific Northwest Lab., Richland, WA (USA)). Feb 1983. Contract AC06-76RL01830. 6p. (CONF-830670—2). NTIS, PC A02/MF A01. Order Number DE83014493.

From International conference on subsurface heat storage in theory and practice; Stockholm, Sweden (6 Jun 1983).

Laboratory, field and geochemical studies have been conducted to characterize physicochemical processes active at the ATES Field Test Facility in St. Paul, Minnesota. These studies provided valuable input to FTF startup and operation as well as insight into the nature of important physicochemical processes in the storage aquifer. Field study results showed that oversaturation of calcite in the heated ground water caused problems in system operation. Field tests also showed suspended solids content of the fluid stream to be within acceptable limits and provided baseline data that aided in guiding operation of the system. Laboratory studies on core samples form the storage aquifer indicated that permeability remained constant over a range of temperature from 25 to 150°C and that migration of internal fines may occur when flow direction is reversed. Geochemical studies of the effect of temperature on fluid chemistry provided essential input for interpreting both field and laboratory test results.

43974 **(PNL-SA—11145) Results of recent research on aquifer thermal-energy-storage technical issues.** Kannberg, L.D.; Raymond, J.R.; Allen, R.D. (Pacific Northwest Lab., Richland, WA (USA)). Feb 1983. Contract AC06-76RL01830. 8p. (CONF-830670—1). NTIS, PC A02/MF A01. Order Number DE83013833.

From International conference on subsurface heat storage in theory and practice; Stockholm, Sweden (6 Jun 1983).

Aquifer thermal energy storage (ATES) was conceived to provide economic storage and retrieval of hot and cold water available from by-product, cogeneration, or natural sources to partially or wholly satisfy later demands for space-temperature conditioning. The needs to reduce electricity-generation peaks and to conserve fossil fluid fuels would be partly met by ATES implementation. Field-test facilities at Mobile, Alabama and St. Paul, Minnesota are evaluating aquifer-system performance involving water injected at 80 and 150°C, respectively. Efficiency of energy recovery and precipitation of solutes from connate water are key issues. Operation of a commercial chill-storage facility is discussed briefly.

43975 **(TULEA—1980-14) Rockstore. A plant for seasonal storage of heat.** Johansson, B.; Nordell, B. (Hoegskolan i Luleaa (Sweden). Avdelingen foer Vattenteknik). Mar 1980. 48p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750777.

Portions are illegible in microfiche products; reprints published in Energimagasinet; No. 4, 49-53 and in Byggnadskonst; No. 11, 45-47.

Heat is seasonally stored in a rock massive which is perforated by boreholes. Heat is supplied and led away by circulating water. Both theoretical and practical investigations are presented. The calculations show how various parameters (temperatures, distances between boreholes, heat conductivity etc.) affect heat content, heat effect and loss. It is found that the storage can be adapted to various energy needs and that the concept may become competitive with other methods, e.g. aquifers.

43976 **United States Department of Energy thermal energy storage program.** Swisher, J.H.; Frier, W.A. pp 465-500 of Thermal energy storage. Lectures of a course held at the Joint Research Centre, Ispra, Italy, June 1-5, 1981. Beghi, G. (ed.). Dordrecht, Netherlands; D. Reidel Publishing Company (1982). (CONF-8106296—).

From Thermal energy storage meeting; Ispra, Italy (1 Jun 1981).

The objective of the U.S. Department of Energy thermal energy storage program is to develop devices, processes and subsystems that permit domestic energy resources to be supplied at the time and locations where they can be used. The program emphasis is in five principal areas: (1) daily storage for active or passive solar and conventional heating and cooling, (2) seasonal storage for building heating and cooling, (3) thermal energy transport, (4) thermal power storage, and (5) chemical heat pumps. The program has a budget of $15.35 million for 1981.

2509 Batteries

43977 (CONF-821211—Absts., pp 19-25) **Status of the Ford sodium-sulfur battery program.** Harlow, R.A. (Ford Aerospace & Communications Corp., Newport Beach, CA); McClanahan, M.L.; Minck, R.W.; Gordon, R.S. Dec 1982. NTIS, PC A15/MF A01.

From 5. DOE battery and electrochemical contractors' conference; Crystal City, VA, USA (7 Dec 1982).

43978 **(COO—2566-24) Ford/ERDA sodium-sulfur battery development. Phase II. Progress report No. 24, September 1-30, 1977.** (Ford Motor Co., Dearborn, MI (USA). Research Staff). Oct 1977. Contract AC02-76ET25106. 19p. NTIS, PC A02/MF A01. Order Number DE83014894.

Progress is reported in the areas of battery container and seal development, development of ceramic electrolyte and seal technology, and battery fabrication and testing. (LEW)

43979 **Method of making electrodes for electrochemical cell.** Kaun, T.D.; Kilsdonk, D.J. (to Dept. of Energy). US Patent 4,386,019. 31 May 1983. Filed date 29 Jul 1981. vp.

PAT-APPL-287856.

A method of making an electrode for an electrochemical cell in which particulate electrode-active material is mixed with a liquid organic carrier chemically inert with respect to the electrode-active material, mixing the liquid carrier to form an extrudable slurry. The liquid carrier is present in an amount of from about 10 to about 50 percent by volume of the slurry, and then the carrier is removed from the slurry leaving the electrode -active material.

43980 **Additive for iron disulfide cathodes used in thermal batteries.** Armijo, J.R.; Searcy, J.Q. (to Dept. of Energy). US Patent 4,383,014. 10 May 1983. Filed date 23 Mar 1982. vp.

PAT-APPL-361151.

The invention comprises thermal batteries employing an FeS_2 depolarizer, i.e. cathode material, and the depolarizer itself. A minor amount of casi2 preferably, 1-3% by weight is provided as an additive in the FeS_2 depolarizer to eliminate the voltage transient (spike) which normally occurs upon activation of batteries of this type. The amount of FeS_2 by weight generally comprises 64-90%.

29 ENERGY PLANNING AND POLICY

REFER ALSO TO CITATION(S) 43283, 44119, 45287, 45289

43981 **(LA—9796-MS) Technology transfer to the East: an annotated bibliography for 1976 to 1981.** Burris, A.E.; Perkins, M.C.; Loose, V.W. (Los Alamos National Lab., NM (USA)). Jul 1983. Contract W-7405-ENG-36. 31p. NTIS, PC A03/MF A01. Order Number DE83015177.

This bibliography specifically addresses the economic aspects of the East-West trade issue, but where relevant, includes some literature oiented toward governments' policies, business, and trade. Included is a brief history of legislative and regulatory initiatives that provides valuable background for the period 1977 to 1981 that this report spans. Although this bibliography is by no means comprehensive, approximately 175 works have been annotated. The references are presented in three groups: (1) books; (2) journals; and (3) newspaper articles, government documents, and other published documents.

43982 **(NP—3770137) Benin - energy situation 1981.** (Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)). Nov 1982. 10p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770137.

The energy situation of this country is reviewed on the basis of some relevant data. Its energy policy is commented on, and developments in electric power generation are described as well as the trends observed for the various energy sources. Figures are given on external trade.

43983 **(NP—3770194) Data concerning the development of the energy economy of the Federal Republic of Germany in 1981.** (Bundesministerium fuer Wirtschaft, Bonn (Germany, F.R.)). Jul 1982. 71p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770194.

Portions are illegible in microfiche products.

After an introductory survey concerning international and national energy policy in 1981 there follow statistics, tables and graphs concerning the balance of primary energy, the structure of energy consumption, the import and export of energy sources, as well as the development of the market (amount produced, utilisation, prices) especially for black coal, brown coal, mineral oil, electricity and gas. To extend these data referring to the Federal Republic of Germany and to compare them the most important energy data of the world are represented.

2901 Energy Analysis And Modeling

REFER ALSO TO CITATION(S) 44030, 44038, 44044, 44109

43984 **(ESC-WR—82-08) Determination of environment parameters for SELPE, a model for energy supply.** van Arkel, W.G. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Mar 1982. 51p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Energy Study Centre, a division of the Energy Research Foundation developed SELPE, a calculation model for the Dutch energy supply. This model enables the calculation of the total emission of air pollutants, based on the input of several energy carriers (coal, natural gas, oil). It is necessary to determine the so-called emission coefficients, i.e. the quantity of the emitted air pollutant in relation to the quantity of the energy flow from one energy carrier. The emission data and the expected input are given for the following subsectors: gas, oil, coal, electricity generation, district heating, industry, householdings, transport. Results are compared with data, earlier obtained by the Dutch Central Bureau of Statistical Data (CBS). Significant differences appear between both calculations, but it is possible to indicate the causes (different definitions, different suppositions of sulfur content of fuels. (10 tables, 24 refs.)

43985 **(USIP—82-04) Some comments on the WEC energy demand model.** Brandell, L. (Stockholm Univ. (Sweden). Fysiska Institutionen). Apr 1982. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750852.

The so-called WEC-model: $E(t)=E(t_0)x(Y(t)/Y(t_0))$ sup(<) $(P(t)/P(t_0))$ sup (;) where E(t) is the energy demand for a region in the year t, Y is the GNP, P is the aggregated energy price and the elasticities γ and β are constants, is generalized. First we consider the case when γ och β are functions of GNP/capita and P. It is shown that in this case the energy demand can vary considerably under various assumptions of population growth. Secondly a time-lag factor for the response to price changes is introduced in the model, and some special cases are considered. We show that under reasonable aassumptions, lag-effects can raise E with 10 per cent or more.

2902 Economics And Sociology

REFER ALSO TO CITATION(S) 43285, 43513, 44018, 44032, 44038, 44039, 44109, 44115, 44116, 44117, 44118

43986 **(CONF-830566—4) Energy-price dynamics and US depressions: recent analogies.** Santini, D.J. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 16p. NTIS, PC A02/MF A01. Order Number DE83014325.

From ENERGY '83 symposium; San Francisco, CA, USA (16 May 1983).

A review of energy-price and -use dynamics in the two US depressions since 1890 reveals that several analogies can be drawn between these depressions. These analogies are extended to recent behavior of the US energy-producing and -consuming sectors. The paper focuses on the combination of point-of-consumption relative energy-price increases and point-of-production energy-price declines which occur during the years of declining industrial output that lead into a depression. A model developed links capital intensity and indebtedness in the energy sector to pricing decisions that are driven by changes in industrial output. It is shown that declining industrial output and energy demand can cause price increases for capital-intense energy utilities, breaking the law of supply and demand. The model's validity is verified by statistical tests carried out over the period 1929 to 1981. The model is tested for the electric-utility industry, the most capital-intense energy producer. It is shown that motor-vehicle price changes provide a far-better prediction of changes in industrial output than do aggregate industrial prices. Changes in the relative price of motor vehicles and electricity are shown to be highly correlated and to be good predictors of changes in real 1982 GNP. It is suggested that the energy-sector

phenomenon demonstrated in this paper might productively be incorporated into macroeconomic models.

43987 (CONF-830672—1) **Optimal stabilization policy in a model of elasticity dynamics.** Bhandari, J.S.; Hanson, D.A. (George Mason Univ., Fairfax, VA (USA). Dept. of Economics; Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 11p. NTIS, PC A02/MF A01. Order Number DE83014745.

From IEEE conference on modeling national economies; Washington, DC, USA (17 Jun 1983).

This paper considers the role of optimal fiscal policy in the context of a macrodynamic model of the open economy. The dynamics of the model are governed by the transition of aggregate demand elasticities from their short-run values to long-run values. If there are no instrument costs attributed to government expenditure, then optimal fiscal policy can achieve perfect stabilization of price and exchange-rate levels. With instrument costs however, this is no longer possible and the optimal fiscal rule is of the linear feedback variety. The paper investigates the properties of this rule.

43988 (ESC-WR—82-11) **Energy prices and employment.** Bruggink, J.J.C. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Mar 1982. 33p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Impact of energy prices on employment is investigated and discussed.

43989 (PNL-SA—10893) **Analytical assumptions and causal ordering in interindustry modeling.** Cronin, F.J. (Pacific Northwest Lab., Richland, WA (USA)). Nov 1982. Contract AC06-76RL01830. 11p. (CONF-8211102—1). NTIS, PC A02/MF A01. Order Number DE83014647.

From North American Regional Science Association meeting; Pittsburgh, PA, USA (14 Nov 1982).

It is possible to employ the standard interindustry model to analyze situations in which the perturbation originates on the supply side, just as it is possible to employ the alternative allocation model in situations in which the perturbation originates on the demand side. That is, there exist four frameworks for employing interindustry models differentiated by the analytical assumptions and causal ordering employed. It is the intent of this paper to theoretically demonstrate and empirically apply these alternative frameworks. Section 2.0 of this paper presents the theoretical frameworks. Some simple empirical results are presented in section 3.0 along with some recommended potential applications. Conclusions are offered in the final section.

2903 Environment, Health, And Safety

REFER ALSO TO CITATION(S) 43252, 43984, 44033, 44109, 44110, 44654, 44655, 44661, 44707, 44709, 44723, 44724, 44752, 44753

43990 (CONF-721002—) **Proceedings of the interagency conference on the environment.** (Lawrence Livermore National Lab., CA (USA)). 1972. Contract W-7405-ENG-48. 364p. NTIS, PC A16/MF A01. Order Number DE83005675.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Topics discussed were mutally limited to environmental modelling, environmental monitoring and measurements, plus analysis and storage of the data resulting from those activities. Papers are entered individually in the EDB data base. (PSB)

43991 (CONF-721002—, pp 11-22) **Federal government, the national laboratories, and the environment.** Talley, W.K. (Univ. of California, Berkeley). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The state-of-the-art of environmental research was addressed, primarily in budgetary terms. (PSB)

43992 (CONF-721002—, pp 23-35) **Overview of research in the Environmental Protection Agency.** Greenfield, S.M. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The EPA approach to environmental problems in the USA seen as immediate threats to human health include: air pollution; water pollution; solid waste disposal; pesticides, toxic wastes and ionizing radiations. Organizational philosophies are given and audience comments are appended. (PSB)

43993 (CONF-721002—, pp 36-51) **Environmental standards.** Barth, D.S.; Durham, W.F.; Porter, C.R.; Cross, J.C. (National Environmental Research Center, Research Triangle Park, NC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The introduction includes a general discussion of environmental standards with emphasis on the required scientific information base which must serve as the underlying foundation for any defensible environmental standards. The general discussion also focuses on the need for setting environmental standards for air, water, pesticides, radiation, noise and toxic substances in a coherent, coordinated fashion with due regard for the complex chemical, physical and biological interactions which normally take place in the biosphere as well as due consideration for socio-economic factors and solid waste management practices. Subsequent sections then provide an overview of present EPA authorities for setting standards in the subject areas of air pollution, water pollution, pesticides and radiation.

43994 (CONF-721002—, pp 52-70) **Development of technology for environmental control.** Breidenbach, A.W. (Environmental Protection Agency, Cincinnati, OH). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The status of the Environmental Protection Agency program on technology for environmental control and the estimated fiscal year 1973 research budget is discussed for: municipal wastes; industrial wastes; combined sewer overflow; oil and hazardous materials; mine drainage; water supply; solid waste; air pollution; and noise pollution. Much technology to control water pollution is available, but achieving the high water quality standards or no discharge requirements that are being promulgated requires much more advanced technology than is now available. Research accomplishments as well as research needs are described. Combined sewer overflows and urban run-off pose severe problems in pollution control. Oil spill prevention and clean-up is yielding to research but is still a young technology, as cleaning of spills of toxic materials. Mining effects air, water, land, and noise pollution. Sealing techniques, treatment of mine drainage, and water recovery are making progress, but much larger sums of money will be required to solve mine pollution problems. Drinking water supply needs research in removal of trace organic and inorganic materials and in better disinfection. Distribution system problems require study. Innovative methods of handling and disposal of solid wastes are under study, and urgent solutions are needed. Air pollution control research centers around developing clean fuel, combustion improvement, and process modification. Noise is new as a program, but many approaches to control are known. Implementation and research need urgent attention.

43995 (CONF-721002—, pp 71-80) **Mission and work programs of the Environmental Studies Division of EPA.** House, P. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The criticality of our immediate environmental problems has led to a high concentration of EPA effort on areas of immediate hazard and concern. This concentration of effort may be categorized as directed primarily to short and mid-range approaches for increasing the effectiveness of operational handling of our environmental problems. However, it has also been recognized that a re-

quirement also exists to better understand the forces which create our environmental problems, develop means for forecasting the long range impact of these forces and device planning and policy guides which will help alleviate their adverse impact. The Environmental Studies Division, Office of Research and Monitoring, Environmental Protection Agency, has a key responsibility in this area. Its specific mission involves development of means to help predict future environmental problems and devise practical planning and policy guidance tools which will help alleviate these problems. This paper describes the task structure developed to approach the ESD mission and the specific work programs and projects designed to effectively accomplish the mission.

43996 (CONF-721002—, pp 145-152) **Land use and transportation impact on air quality.** Venezia, R.A. (Environmental Protection Agency, Research Triangle Park, NC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The growing recognition of the potentially adverse environmental impact of transportation systems is well documented by 15 years of Federal legislation. Legislative history reflects increasingly stringent corrective policies to minimize adverse environmental impacts. Federal actions toward a national policy are reviewed.

43997 (CONF-721002—, pp 153-157) **Research problems and issues in the application of land use controls to environmental protection.** Croke, K.G.; Kennedy, A.S.; Baldwin, T.E. (Argonne National Lab., IL). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The relationship between environmental quality, land use, and economic development has raised a series of policy-related research issues with respect to the future direction of federal, state, and local environmental programs. Questions regarding whether land use controls can or should become an integral part of the environmental protection program have led to a number of exploratory research efforts sponsored by federal agencies. This paper describes the general problems addressed by these projects and presents a summary of the preliminary results of these investigations.

43998 (CONF-721002—, pp 166-176) **Monitoring environmental quality.** Morgan, G.; Ozolins, G.; Sayers, W. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Data collected through monitoring activities provide information for assessment of pollution effects on man and his environment, the development and evaluation of control strategies, and the guidance of future development to minimize pollution impact on the environment through the use of modeling and planning. To meet present and future needs and responsibilities, Federal, State, and local control agencies, along with the private and industrial sector, must participate in a cooperative and unified system for collecting, storing, analyzing, and interpreting environmental data. The nation's monitoring networks are now undergoing modifications in order to meet legal requirements both as to extent of geographical coverage and environmental pollutant coverage at each station. The Environmental Protection Agency (EPA) is expanding its monitoring capability to include remote sensing, using advanced techniques already developed but not presently employed for monitoring pollutants. Future coordinated monitoring programs at all levels will need a nation-wide quality assurance program.

43999 (CONF-721002—, pp 177-197) **EPA measurements and instrumentation program.** Forziati, A.F.; Swaby, L.G. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

This paper is a brief presentation of the Environmental Protection Agency's measurements and instrumentation research and development program. The paper identifies the present high priority needs, some future requirements and the resources associated with the program. The purpose of the presentation is to brief the extramural community, including other Federal Agencies, of EPA's capabilities and needs in the area of measurements and instrumentation. It is hoped that the presentation will allow interested groups to identify capabilities and expertise within their own programs which may be applicable to EPA's needs.

44000 (CONF-721002—, pp 212-223) **Remote sensing for environmental protection.** Koutsandreas, J.D.; Holmes, R.F. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Remote sensing is usually defined as the use of sensors or sensor systems to detect and measure natural and cultural phenomena from air-borne or space-borne platforms. As discussed in the text, this term takes on a much broader meaning in the Environmental Protection Agency. It is the purpose of this paper to outline the role of EPA in investigating the role of remote sensing in monitoring activities. Monitoring, as defined, is the systematic collection and evaluation of physical, biological, and chemical data pertaining to environmental quality and waste discharges into all media. The discussion includes a summary of present EPA capabilities and a review of FY '72 activities. In an effort to establish the EPA role in remote sensing and the direction of the EPA developmental thrust, an outline of technology needs and FY '73 to '74 programs and resource expenditures are covered. This includes a discussion of sensors, applications and programs. The need for a review of the state of the art and an evaluation of existing sensors is emphasized.

44001 (CONF-721002—, pp 275-286) **Survey of AEC and NASA capabilities in computerized data management.** Gove, N. (Oak Ridge National Lab., TN); Watson, V. 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Existing AEC and NASA facilities which could contribute to environmental data management are reviewed. These include some of the worlds largest, fastest computers, largest memory devices and most highly developed data management and retrieval systems. Tables of some AEC and NASA large computers and large data management projects are given.

44002 (CONF-721002—, pp 287-301) **Federal laboratories as centers of excellence in the environmental sciences: a case study.** Croke, E.J.; Norco, J.E. (Argonne National Lab., IL). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Many of the large, multidisciplinary AEC and NASA laboratories have developed, over the years, into major centers of excellence in most branches of the physical, biological, and engineering sciences, but both legal and programmatic constraints have tended to impede other federal agencies, and state and local government from accessing these facilities. The relaxation of some of these constraints, combined with the recent shift of national priorities toward goals that reflect a more acute sense of social conscience, has focused attention on the question of whether the system of federal laboratories is a national scientific resource that can provide general scientific support for all levels of government. In particular, current EPA interest in the establishment of regional environmental studies centers suggests the possibility of a new role for the federal laboratories. Recent efforts made by many of these facilities to serve sponsors other than their parent agencies are indicative of their ability to function in this capacity. The evolution of the environmental studies program at Argonne National Laboratory, from its inception in 1967 with the Chicago Air Pollution Systems Analysis Program to its present level of diversification, offers an example of how a mission-oriented, interdisciplinary research center can develop from a core project involving both a federal sponsor and a local agency of government. The history of the relatively successful Argonne program provides a number of pragmatic lessons for research institutions that aspire to a similar role.

44003 (CONF-721002—, pp 302-313) **Cities, states, and national laboratories: an account of productive interaction.** Kostyk, N.L. (Argonne National Lab., IL). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The manpower and facilities of most of the AEC and NASA laboratories have been placed at the disposal of state and local governments in joint efforts to resolve environmental degradation and resource management problems. Air and water quality, land use, public health, solid waste management, and natural disasters are only a few of the categories being researched. Where programmatic and financial constraints are not in the forefront, maximum use of these laboratories by all levels of government has been encouraged and has produced gratifying results.

44004 (CONF-721002—, pp 314-358) **Workshop reports.** 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Workshop reports are cumulated on: atmospheric transport models; water transport models; land use planning; unified environmental data system; environmental monitoring; remote sensing; advanced sensing techniques; and transfer of scientific personnel. A banquet address is included which essentially summarizes the conference speeches. A second official summary is also appended, with conference attendee lists. (PSB)

44005 (CONF-810298—) **Applications of nuclear and applied techniques in public health and pollution control. Proceedings.** (USAEC Division of Headquarters Services, Washington, DC). 1981. 348p. NTIS (US Sales Only), MF A01. Order Number DE83902554.

From National symposium on applications of nuclear and allied techniques in public health and pollution control; Bombay, India (12 Feb 1981).

Microfiche only, copy does not permit paper copy reproduction.

An overview of the application of radiosterilization techniques and tracer applications for use in pollution control in India is presented. Focus is on public health hazards which are mitigated or avoided by chemical effluent treatment. (PSB)

44006 (ESC-WR—82-06) **SO2-, NOx- and dust-emissions in the energy model SELPE: an integrated energy/environmental model.** van Oostvoorn, F. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Feb 1982. 59p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

A mathematical model called SELPE, describing the Dutch energy supply, has been augmented with an environmental part which handles the emissions associated with the energy systems in SELPE. The methodological and empirical aspects of implementing the emission model into SELPE are dealt with.

44007 (ESC-WR—82-13) **Risks of energy systems.** Over, J.A. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Mar 1982. 25p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

Existing studies on the risk assessment of energy systems are briefly compared. Generally three parts in risks assessment can be determined. First the assessment of risks in a broad sense, secondly the assessment of risks by people and thirdly the use of risk assessment in political decision making.

2904 Natural Resources

REFER ALSO TO CITATION(S) 44721

44008 (ONWI—169) **Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi.** Murray, G.E. (Law Engineering Testing Co., Atlanta, GA (USA)). Jun 1983. Contract AC06-76RL01830;AC02-83CH10140. 95p. NTIS, PC A05/MF A01. Order Number DE83015324.

This report attempts to evaluate, as quantitatively as reasonable, the possible potential resources around seven salt domes in East Texas, Louisiana, and Mississippi. Any estimation of possible potential resources is difficult under the most favorable circumstances, so in the absence of precise geophysical data supplemented by drilling, any such estimates must be considered best-guess estimates. It is possible, however, to achieve a range of possible amounts of potential resources, the maximal ranges being impractical but, providing a framework within which future data will categorize and evaluate the resources more precisely. These volumetric ranges of potential resources for each dome have been estimated and each dome then ranked on a scale of 1 to 10 for (a) prospectivity of the enclosing stratigraphic sequences, (b) structural prospectivity, (c) prospectivity relative to different possible potential resources, and (d) a collective prospectivity.

44009 (TVA/OACD—83/6) **Fertilizer trends 1982.** Bridges, J.D. (National Fertilizer Development Center, Muscle Shoals, AL (USA)). Jan 1983. 52p. NTIS, PC A04/MF A01. Order Number DE83902236.

Contents of this publication are as follows: TVA fertilizer program; the fertilizer market; trends in nutrient use; nitrogen; phosphate; potash; sulfur; Canada; North American production capacity data; and statistical sources and suggested references.

2905 Research, Development, Demonstration, And Commercialization

REFER ALSO TO CITATION(S) 43437, 43491, 43971, 43976, 43995, 44002, 44051, 44052

44010 (BEOP—5) **Research program of energy storage in flywheels. Results and recommendations.** (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Jun 1981. 24p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

A review of the National Program in the Research and Development of Flywheels has been given. A market exploration for the applications of flywheel systems has been listed. Brief descriptions of the research programs of flywheel energy storage have been given. Possible application in the utilization of hybrid diesel-engine systems for automobiles, trains with flywheel units, flywheels for energy storage for stabilization of wind power or solar energy, flywheel units for computer centres, industry, substations of railways and other applications have been formulated. Recommendation for the continuation of the National Program of Flywheel Research has been suggested. In addition a list of completed projects of flywheel research has been given.

44011 (EUR—7897-FR) **Evaluation of research and development. Methods for evaluating the results of European Community R + D programmes.** Boggio, G.; Gallimore, R. (Commission of the European Communities, Luxembourg). 1982. 138p. (In French). (CONF-820173—). Available from Commission of the European Communities, Luxembourg.

From Conference on evaluation of research and development; Brussels, Belgium (25 Jan 1982).

The papers of the meeting dealing with the subject of research and development within the European Community and with the endeavours of the Commission are reproduced. As part of the very general papers also some special topics are treated, e.g. the programme concerning nuclear fusion and the programme concerning treatment and storage of radioactive wastes.

44012 (INIS-mf—7670) Annual report 1981. (Stichting Energieonderzoek Centrum Nederland, The Hague). Jun 1982. 84p. (In Dutch). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780939.

The Energy Study Centre of ECN gives briefly the progress of the energy modeling studies, integral energy scenarios, the energy-supply studies and energy demand studies. The substitution of crude oil into other energy sources for the Netherlands is described. The introduction of solar heating systems in the Netherlands is economically analysed. The sociological impact in households for energy conservation is investigated. The Project Office of Energy Research reviews the management of the national and international cooperation in the research programs of wind power, solar energy, coal technology, flywheels and MHD conversion. The research projects of ECN in the fields of nuclear physics and technology, nuclear fusion and superconductivity, combustion energy - fluidized bed combustion of coal and MHD conversion -, pollution control of aerosols, reactor operation and maintenance of the HFR and LFR reactors, reactor safety studies in the fuel cycle, the radioactive waste storage and the wind energy, are reviewed. A list of seminars held and publications follows. Details are given of personnel, finance and the accounts.

44013 (NP—3770045) Institute in the year of 1981. Hedden, K.; Griesbaum, K.; Leuckel, W.; Sontheimer, H. (Karlsruhe Univ. (T.H.) (Germany, F.R.)). May 1982. 117p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770045.

Portions are illegible in microfiche products.

The report contains the briefs of the scientific works at the Engler-Bunte-Institut concerning dissertations and selected publications. It is further reported about the educational work, lectures, publications and the works on the technical application. Concerning the work in the DVGW research agency the work of the outdoor service, the analytical laboratory and completed expertise in the field of gas, petroleum and coal, combustion engineering and water chemistry are represented.

44014 Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves. Agarwal, B. (Univ. of Delhi, India). *World Development;* **11**: No. 4, 359-376(Apr 1983).

The literature on the diffusion of rural innovations in Third World countries reveals a spectrum of approaches to the diffusion process. It is argued here that the effectiveness of a particular approach in the diffusion of particular innovations would depend on the technical, the economic, and the social characteristics of the innovations. A typology of innovations in terms of these characteristics has been drawn up. This provides the analytical framework within which the instance of wood-burning stoves is concerned. A priori, the characteristics of this innovation are seen to be such as to necessitate the close involvement of the users approach to diffusion. Available evidence relating to actual experience with promoting woodburning stoves is seen to bear this out. 62 references.

44015 Evaluating new US energy technologies. Hill, D.; Sailor, V.L.; Fishbone, L.G. (Brookhaven National Lab., Upton, NY). *Energy Economics, Policy and Management;* **2**: No. 4, 40-49(Spr 1983).

The problem of assessing the value of new energy technologies is complex and requires long-term marketplace competition evaluations. Brookhaven National Laboratory (BNL), under the auspices of the International Energy Agency (IEA), has evaluated the potential of 56 new and existing technologies, broken down into the seven major technological areas of coal, oil and gas, nuclear, solar, geothermal, conservation, and miscellaneous. A table illustrates the following features of each technology: investment cost, fixed operating and maintenance costs, variable O & M costs, availability factor, efficiency, introduction period, and lifespan in years. 1 table.

2906 Nuclear Energy

REFER ALSO TO CITATION(S) 43310, 43332, 43344, 43351, 43365, 43403, 43743, 43825, 43827, 43828, 43940, 43947, 44652

44016 (CBPF-CS—002/81) Economical and strategical aspects of Brazilian-Germany nuclear agreement. de Carvalho, J.F. (Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro). 1981. 80p. (In Portuguese). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83702201.

The strategical and economical aspects of Brazilian-Germany nuclear agreement are analyzed in three aspects: (1) the nuclear agreement in the context of the Brazilian economic - and social development process, considering the availability of energetic resouces of the country. Political implications; considerations about creation and transfer of technology; (2) The economy aspects involved in the agreement. Comparison costs of electrical energy generated in a nuclear power plants and hydroelectric plant in Brazil. Impacts on the industrial development. 3) Strategical aspects.

44017 (CONF-8209149—4) Government development and export policies. Livingston, R.S. (Australian Uranium Export Office, Canberra). 1982. 11p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902565.

From Australian uranium symposium; Frankfurt, F.R. Germany (6 Sep 1982).

This paper outlines the framework of Government policies within which the Australian uranium industry is developing. A brief resume of the policies covering the development of new uranium projects in Australia is provided, with the main emphasis of the paper on Australia's uranium export policy.

44018 (ER—81-2E) Nuclear policy review background papers. (Department of Energy, Mines and Resources, Ottawa, Ontario (Canada)). 1981. 364p. NTIS (US Sales Only), PC A16/MF A01. Order Number DE83780850.

Selected papers were processed for inclusion in the Energy Data Base.

44019 (ESC-WR—82-23) Calculation method of the power generation costs of a nuclear power plant. Koenders, N.J. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Sep 1982. 11p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

The costs for generating electric power with nuclear power plants are mainly determined by the capital costs, the operating costs and the fuel costs. The author describes the methods which are used to calculate the electric power costs taking into account the inflation.

44020 (INIS-mf—7359) Nuclear energy and its public acceptance in Japan. Matsui, A. (Japan Atomic Energy Relations Organization, Tokyo). 1981. 11p. (In French). (CONF-8110236—20). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780888.

From International study meeting on modern power stations; Liege, Belgium (26 Oct 1981).

Heavily dependent on imported oil, Japan with a nuclear park of 22 working power plants meets with public opposition for its nuclear program extension. Consequently, the foreseen 53.000 MWe installed nuclear capacity will be reduced to some 30.000 MWe for the beginning of the nineties. The paper analyzes the different varieties of factors clogging the development of nuclear energy such as social, psychological and economic aspects and describes the information campaigns of concerned milieus in order to deal with this situation and comments on the final results of these actions. Two concrete examples of confrontation of the public with the authorities on the approval of new nuclear power plant projects are presented. (AF).

44021 **(INIS-mf—7592) Act N° 65-954 of 12 November 1965 authorizing ratification of: 1. the Convention on Third Party Liability in the Field of Nuclear Energy, signed in Paris on 29 July 1960 and its Additional Protocol, signed in Paris on 28 January 1964; 2. the convention Supplementary to the Paris Convention of 29 July 1960, signed in Brussels on 31 January 1963, and its Additional Procol, signed in Paris on 28 January 1964.** (France). 12 Nov 1965. 1p. (In French). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780935.

The so-called Paris Convention was concluded among 17 European countries and is in force since 1968. It provides for a special third party liability system for nuclear operators, namely, the operator's absolute liability which is limited in amount. The Brussels Convention, Supplementary to the Paris Convention is in force since 1974 and increases the amounts of compensation for nuclear damage by means of public funds.

44022 **(INIS-mf—7594) Decree N° 69-154 of 6 February 1969 publishing the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960 and the Additional protocol thereto of 28 January 1964.** (France). 11 Feb 1969. 29p. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780936.

In accordance with the Act of 12 November 1965 authorizing ratification of the Paris Convention, this Decree publishes that Convention.

44023 **(INIS-mf—7607) Nuclear power plants. Legal aspects - installation - construction - operation.** de Lima Moreira, Y.M. (FURNAS, Rio de Janeiro (Brazil)). 1981. 14p. (In Portuguese). (CONF-8108146—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780934.

From 10. conference on the law of the world; Sao Paulo, Brazil (16 Aug 1981).

The legal procedures for the installation, construction and operation of a nuclear power plant in Brazil are discussed.

44024 **(INIS-mf—7608) Some considerations on the Tlatelolco Treaty.** de Faria, N.M.; de Goes Fischer, M.D. (Associacao Brasileira de Direito Nuclear, Rio de Janeiro:. (Associacao Brasileira de Direito Nuclear, Rio de Janeiro). 1981. 12p. (In Portuguese). (CONF-8108146—). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780937.

From 10. conference on the law of the world; Sao Paulo, Brazil (16 Aug 1981).

Some considerations related to the Tlatelolco Treaty are focused and so are the role and the position of Brazil in view of the Treaty. Short historical remarks are presented in order to show the commitments of Brazil with the Treaty. Finally, considerations concerned with the validity of the Treaty as the legal instrument to contribute to the security and peace in the World.

2907 Transport And Storage

REFER ALSO TO CITATION(S) 43968

2908 Waste Heat Utilization

REFER ALSO TO CITATION(S) 44110, 44708

2910 Conservation

REFER ALSO TO CITATION(S) 44060, 44074, 44081, 44085, 44086, 44113, 44114, 44115, 44116

44025 **(ISI—101907) Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors.** Jochem, E.; Herz, H.; Legler, H. (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Karlsruhe (Germany, F.R.). Inst. fuer Systemtechnik und Innovationsforschung). May 1978. 88p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751041.

Portions are illegible in microfiche products.

Within the "Principles and Basic Data for the Updating of the Energy Programme" of 23rd March 1977, conservation measures were suggested by the public authorities. In order to reevaluate these measures and to update the governmental energy programme, in Autumn 1977 the BMFT established an "energy working group". Some of these activities were carried out by ISI within a work contract. The results gained so far from the r and d projects were evaluated. Furthermore, some supplementary financial and administrative measures were suggested and assessed with regard to their effects on the economic potentials of energy-conserving methods.

44026 **(ORNL/TM—8771) Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts.** Collins, N.E.; Reed, J.H.; Braid, R.B. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 99p. NTIS, PC A05/MF A01. Order Number DE83014887.

A systematic method of examining the pros and cons of energy-conservation impacts was developed around five impact areas: legislative/policy; institutional; technological; environmental/economic; end-users; and energy savings. Each area is discussed in terms of (1) alternative ways of evaluating and reporting program impacts, (2) data needed to support such alternative methods, (3) the pros and cons of the methods and data, and (4) recommendations about the suggested alternatives. The last chapter contains a rating system for selecting impact areas for further study as rated by: existence of available methodologies for evaluating impacts; the availability of data or information; the quality of the best available data or information; the need for assessment of the impact; the potential usefulness of assessment results; the type of skills required for conducting the proposed assessment; and the timeframe and scope of the proposed assessment. This evaluation identified the following areas: state commitment; federal and state legislation; unique state legislation; state policies; state planning capabilities; state-evaluation capabilities; and awareness/attitudes of energy end-users. These seven impact areas comprise nearly 30% of the 24 areas which were rated.

2920 Supply, Demand, And Forecasting

REFER ALSO TO CITATION(S) 44015, 44035

44027 **(DOE/EIA—0202(83/2Q)-1) Short-term energy outlook. Volume 1. Quarterly projections.** (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). May 1983. 44p. NTIS, PC A03/MF A01. Order Number DE83014722.

Portions are illegible in microfiche products.

World oil consumption is projected to decline in 1983 for the 4th consecutive year. Despite reduced petroleum production by OPEC, weak worldwide demand for petroleum and increased production by non-OPEC countries has put downward pressure on oil prices. As a result, OPEC lowered its official price for Saudi marker crude oil to $29 per barrel in March. The recent declines in world petroleum consumption are projected to end during the second half of 1983 as economic growth resumes in the industrial-

ized countries. In view of the recent firmness in the world petroleum market, it is projected that petroleum prices will stablize near current levels. In the base case forecast, the price of imported crude oil to US refiners is assumed to remain at its current level of an estimated $29.43 per barrel through mid-1984.

44028 **(DOE/NBM—3015045) Alternative energy futures: a review of low-energy-growth forecasts and least-cost planning studies.** (Putnam, Hayes and Bartlett, Inc., Cambridge, MA (USA)). Jun 1983. Contract W-7405-ENG-26. 256p. NTIS, PC A12/MF A01. Order Number DE83015045.

The radical decrease in the rate of growth of energy demand surprised energy planners in the 1970s. This change created an environment for reassessing the vision of our energy futures. Such reassessments were undertaken in a series of prominent comprehensive studies in the last half of the decade. These studies were given various labels such as soft path or least-cost according to their views and methodology, but they were all characterized as foreseeing low-demand energy futures for the United States. More recently, the approaches and views represented by these national studies have been applied to local energy planning and particularly to issues concerning the future need for new electricity generating capacity.

44029 **(EFN-AES—1982-1) Future energy landscape. Geographic image of the energy bill of 1981.** Wallin, S. (Energiforskningsnaemnden, Stockholm (Sweden)). 1982. 72p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750854.

The paper presents a survey of biomass fuels and the demand of solid fuel. The conversion of the consumption from oil to solid fuels is discussed. The government bill proposes by the year 1990 substitution for 3 M tons of oil by wood, corresponding to 1,5 M tons, peat, equivalent to 1 M tons and straw, equivalent to 0,5 M tons of oil. The introduction of solid fuels has been investigated as to the problems of refining, transport and firing. The supply and demand of solid fuels has been analysed by dividing the country into 100 areas each having 83000 inhabitants. The difference between the areas lies in their industrial structure. It has been found that coal and unrefined biomass fuel might compete for the same market. The flow of biomass fuels by 1990 is calculated equivalent to 3150000 tons of oil rendering about 15000 year-works, distributed among 60 percent on production, 15 percent on transport refining 5 percent and firing 20 percent.

44030 **(ESC—17) Description of SELPE, a model of the Dutch energy supply.** Boonekamp, P.G.M. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). [nd]. 221p. (In Dutch). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83770211.

The Static ESC Lineair Programming Energymodel (SELPE), which is in use since 1981 for energy policy analysis, is described. Basis of the model is a network description of the Dutch energy system. The Lineair Programming technique is used to assess possibilities and consequences related to a certain structure of our future energy system. Subjects covered are: choice of model type and possible applications; general description of the model; description in detail of the energy system and, from that, the network structure with energy flows, nodes and processes; modelling of financial and environmental aspects including government profits; translation into a standard l.p.-formulation; in- and outputs, datahandling.

2930 Policy, Legislation, And Regulation

REFER ALSO TO CITATION(S) 43365, 43677, 43991, 43992, 43993, 44017, 44026, 44029

44031 (CONF-8208141—, pp 378-395) **Energy: everybody's business.** Coover, H.W. Jr. (Tennessee Eastman Co., Kingsport, TN). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

We have everything necessary to meet our future energy requirements. The natural resources, both conventional and unconventional, and the scientific expertise. We have the capital to fund the critical projects, no matter how large. Whether we develop our energy resources in a timely manner depends on the interaction and cooperation among industry, government, and society. How can we choose the proper course to assure adequate energy supplies. An immediate answer is to reduce the growth in energy demand through conservation. Over the past 10 years, the industrial sector has responded to higher energy prices by decreasing its own energy consumption by 14%. The largest industrial energy customer is the chemical industry which has cut its consumption even more, by 24%. In the meantime, the total use of coal in this country has been increased by over 25%. Conservation alone will not be enough to sustain our economic growth. At best, the result is a only postponement of doom. The only really effective answer to our energy and feedstock problems is the substitution of scarce resources with more plentiful alternatives, such as coal. If this is to be achieved, a business climate more favorable to risk-taking must be established. In fact, we need to embrace the free enterprise concepts which made this country great. The Federal Government will have to provide certain incentives such as loan guarantees, access to federal lands, and government purchase commitments. The government must resist temptations to pass stifling energy taxes to reduce federal deficits or to delay construction permits on projects of national importance to protect local interests. Government and industry must work together so that no private company will have to take unreasonable risks.

44032 **(DOE/CS/24436—T1) Small business energy regulation project. Final report.** (IMR Corp., Falls Church, VA (USA). Energy, Management and Marketing Div.). 30 Jul 1981. Contract AC01-80CS24436. 108p. NTIS, PC A06/MF A01. Order Number DE83015155.

Portions are illegible in microfiche products.

The IMR corporation undertook a five-part study to examine the impact of federal energy policies and regulations on small business. The first task involved the selection of the five energy-intensive small business industries; i.e., those that would be most affected by federal energy policies and regulations. This involved collecting data on small business energy consumption patterns and then selecting three to five industries for further analyses based on energy intensiveness and other selection criteria. The second task involved the development of small business models for the five energy-intensive small business industries selected in Task I. The purpose of this effort was to facilitate understanding of key business factors in selected industries and to illustrate the impact of federal energy policies and regulations. Business data for the selected inductries were collected and a determination of key business factors was made. Using industrial financial ratios, models were constructed that presented a range of typical ratios for each type of firm. IMR then undertook a comprehensive review of all federal energy policies and regulations that could have adverse impacts on the selected small business industries. Completion of this task involved a review of the most recent documentation available since the regulatory environment was quite literally changing on a daily basis through the efforts of the new administration. After determining federal energy policies and regulations that had the greatest adverse impact, IMR, initiated Task 4, which involved an indepth examination of the energy policy chosen for further review by the DOE Project Officer. Analysis of policy impacts included illustrations of financial impact on the small business models, trend analysis, and review of subtle policy applications that resulted in adverse impacts on small business. The fifth task involved the preparation and submission of this final project report.

2940 Fossil Fuels

REFER ALSO TO CITATION(S) 43151, 43243, 43285, 43292, 43293, 44027, 44031

44033 (CONF-8208123—, pp 573-587) **Trends in energy production.** Botta, L. (International Energy Agency, Paris. Alternative Energy Sources Division). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Summary of the energy situation and trends for the next few years, as seen in the IEA is presented. The perspectives and trends in oil, natural gas and coal development in energy economics and the restraints imposed by public mistrust on nuclear power development are surveyed briefly for the closest future. Coal policies of the OECD indicate that abrupt price increases as known in the oil market will be avoided for coal. Our technical and legislative measures are established in order to protect environment and use more coal. The complexity and uncertainty of the situation are so great that we can be certain that our outlook and forecasts will be wrong - we simply hope that they will be less wrong than other forecasts, and that they will be close enough to being right that our planning and decisions taken on the basis of these forecasts will prove to be farsighted and correct. Our confidence is particularly strong in our judgements that the major use of coal will be generating electricity, and that coal-fired electricity will serve a major part of the new demand for electricity that develops, whatever large or small that demand may be. That increase in coal-fired electricity presumes answers to the current issues about the relationship of coal use to the environment, yet we are still seeking those answers.

44034 (CONF-8208141—, pp 11-41) **Oil supply/demand pricing trends.** Barnes, J.E. (Conoco, Inc., Houston, TX). 1982. NTIS, PC A24/MF A01.

From 9. annual international conference on coal gasification liquefaction and conversion to electricity; Pittsburgh, PA, USA (3 Aug 1982).

This paper gives petroleum production (OPEC and non-OPEC) for 1979 to 1982; OECD and US petroleum stocks for the same period. The former increased from 1979 to 1981 and the latter decreased slowly over the whole period, but more rapidly in the first half of 1982 (the last period). Free world demand decreased slightly, and non OPEC supply increased slightly, so OPEC production decreased about 15%. The production of Saudi Arabia increased till the middle of 1981 and has since decreased. Saudi Arabia by itself appears to be able to reduce production sufficiently to maintain close to current price levels and still get sufficient revenue from oil sales so that their economy does not suffer too much. Given the expected world demand; several other nations must maintain production and sales to retain economic stability. The overall conclusion is that the petroleum market and prices will continue to be sloppy for the next year and a half followed by a closer balance between supply and demand for the rest of the eighties with price increases equal to, or slightly above, inflation. This scenario is unlikely to result in price increases sufficient to justify major investments in coal or synthetic fuels substitution. (LTN)

44035 **(DOE/EIA—0125(83/1Q)) Coal distribution, January-March 1983.** McNair, M.B. (USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels). Jun 1983. 117p. NTIS, PC A05/MF A01. Order Number DE83015264.

Portions are illegible in microfiche products.

This publication contains preliminary data on the distribution of coal in the US under the following headings: by coal producing district; by coal producing area; by destination; by consumer category; by method of distribution; by census region and destination and consumer category; by census region and destination and method of transport, and by consumer category and method of transport. Production and/or purchases of coal in the United States from January-March 1983 totaled 191.1 million short tons, 13 percent below the 219.2 million tons produced or purchased during the same period of 1982. Distribution of coal during January-March 1983 totaled 189.8 million tons, a decrease of 10 percent from the 211.4 million tons distributed during January-March 1982. A total of 1.3 million tons of coal was added to stocks held by producers and distributors during January-March 1983. (DMC)

44036 **(DOE/EIA—0395) Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). May 1983. 177p. NTIS, PC A09/MF A01. Order Number DE83015194.

Portions are illegible in microfiche products.

This report contains an analysis of known and ultimately recoverable crude oil and natural gas resources in the following Persian Gulf states: The Kingdom of Saudi Arabia, The State of Kuwait, The Islamic Republic of Iran, The Republic of Iraq, The United Arab Emirates: Sheidkom of Abu Dhabi, Sheikdom of Dubai, and Sheikdom of Sharjah, The Divided Neutral Zone (administered jointly by Saudi Arabia and Kuwait), The State of Qatar, The Sultanate of Oman, and the State of Bahrain. The rates that oil resources will likely be available to world markets are also covered in this report. A comprehensive analysis was made of the ultimately recoverable oil in 150 fields. This included all of the giant fields (63) and, with a few minor exceptions, all of the producing non-giant fields (46). It also included 41 non-producing fields. Analysis indicated that 547 billion barrels of ultimately recoverable oil was found in these fields. This would include 87 billion barrels of oil which will require advanced recovery techniques if the oil is to be extracted from the reservoirs. Excluding the 128 billion barrels of the known recoverable oil produced through 1981, the known recoverable oil remaining at year-end 1981 was about 419 billion barrels. If the average production during the 1990's remained the same as in the 1980's, the known resource base at the end of the 20th century would be reduced to 249 billion barrels or about a 29 year supply. Therefore, by the year 2000, over one-half of the total known oil resource base would be depleted, and production levels would of necessity decline as it would be difficult for the known fields to maintain an aggregate production level of 8.46 billion barrels per year. (DMC)

44037 **(DOE/EIA—0398) Petroleum resources of Venezuela and Trinidad and Tobago.** (USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas). Jul 1983. 58p. NTIS, PC A04/MF A01. Order Number DE83015427.

Portions are illegible in microfiche products.

The status of known and ultimately recoverable crude oil and natural gas resources of the Federal Republics of Venezuela, and Trinidad and Tobago (hereafter referred to as Trinidad) is set forth in this report. The rates that oil resources may be available to world markets are also covered in the report. A section on the petroleum geology of the region is included. The Republics of Venezuela and Trinidad share a common and ancient petroleum history. Over a century of exploration and development have resulted in the cumulative production of nearly 39 billion barrels of oil from Venezuela and over 2 billion barrels from Trinidad. Both republics have passed their peak status as oil producers. Venezuela reached its peak as the second largest producer in the world in the mid-fifties, and Trinidad attained its highest status as the eighth largest oil producer in the early forties. The report concludes that Venezuela and Trinidad have depleted slightly less than one-half of their ultimately recoverable crude oil resources. Based on feasible production rates and estimates of remaining recoverable resources, nearly two-thirds of Venezuela's oil resources and about three-fourths of Trinidad's oil resources may be depleted by the year 2000. The natural gas resources of both countries are underutilized and underdeveloped.

44038 **(DOE/EIA—0412) Oil market Simulation model documentation report.** Grillot, M. (USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use). Jun 1983. 155p. NTIS, PC A08/MF A01. Order Number DE83015397.

Portions are illegible in microfiche products.

This report provides documentation of the Oil Market Simulation (OMS) Model, the principal model used by the Energy Information Administration (EIA) to project future world oil prices. The OMS model is continually being updated and improved. The

methodological and technical discussions in this report document the version of the OMS model used in preparing forecasts for the Energy Information Administration's 1981 Annual Report to Congress. the Printed Model Output section of Chapter 5 and the annotated listing of the OMS model computer program in the Appendix reflect improvements in the output formats and the FORTRAN code of the OMS model that were made in developing the version of the OMS model used in preparing the Energy Information Administration's 1982 Annual Energy Outlook. The methodology underlying this improved version of the OMS model is, however, the same as that underlying the version used in preparing the 1981 Annual Report. The purpose of the documentation is to enable public access and understanding of this EIA computer model. It is intended to serve a wide audience of users and other interested parties both within and outside the US Department of Energy. The major sections of this report are entitled: Model Overview, Model Description and Data Base Description, Model Applications, and Users Guide and Software Description.

44039 **(DOE/NBM—3015565) Third World petroleum development: a statement of principles.** (National Petroleum Council, Washington, DC (USA)). 1982. 46p. National Petroleum Council, 1625 K Street, N.W., Washington, DC 20006.

Measures that could facilitate the development of petroleum in nontraditional provinces throughout the world were investigated. The study analyzes the factors that affect the decisions of US private petroleum companies to explore for and develop petroleum in the oil-importing developing countries (OIDCs) of the Third World. This report discusses these factors and recommends measures that OIDCs and the US government can take to encourage private companies to explore for and develop oil and gas. The NPC's view of the appropriate role for certain third party public agencies, in particular The World Bank, is also discussed. The study does not include detailed resource assessments or critique the programs of specific OIDCs, nor does it discuss oil and gas exploration and development activities of countries outside the free world. It was concluded that while geological considerations are paramount in deciding whether to invest in an exploration venture, US petroleum companies also carefully evaluate the fiscal, political, and operating risks associated with each prospect before deciding whether to advance the substantial capital and technical resources needed for a successful venture. Governments that desire to attract investment must offer terms that are competitive with those offered by other countries and that enable a petroleum company to earn a profit commensurate with its risks. Governments can enhance a given venture by reducing the risks that are within their control. Furthermore, a cooperative relationship between the government and the petroleum company can overcome many obstacles, including lack of infrastructure.

44040 **(NP—3902881) Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983.** Jackson, J.B. (Rogers, Golden and Halpern, Inc., Philadelphia, PA (USA)). Apr 1983. 32p. Dept. of the Interior, Office of Offshore Information Services, Minerals Management Service, 12203 Sunrise Valley Dr., MS 640, Reston, VA 22091.

For several years, exploratory drilling has been at a standstill in the subregion. Drilling stopped in the Gulf of Alaska on July 1, 1978, when Exxon, using the Alaskan Star, drilled a dry hole on a Lease Sale 39 tract. In the Cook Inlet drilling continued until June 28, 1980, when ARCO, using the Ocean Bounty, drilled a dry hole on a Lease Sale CI tract. Exploratory drilling has now resumed, however. ARCO, the most active bidder in Lease Sale 55, has submitted an exploratory plan covering seven tracts, and spudded its first well on April 10, 1983. Chevron has two approved exploration plans for Lease Sale 60 tracts and is planning to drill later this year. The existing infrastructures were capable of meeting the demands placed upon them during exploration activities resulting from Lease Sales 39 and CI. Because similar support will be required for the exploration of tracts leased in Lease Sales 55 and 60, the effects on communities providing support are expected to be minimal. If a commercial discovery of oil or gas is made in the Gulf of Alaska subregion, the OCS Information Program will issue a new summary report to aid State and local planners plan for the effects associated with development. Otherwise, this report will be updated aperiodically. The staff of the OCS Information Program is also available to assist agencies if additional information or clarification is desired. The address and phone number of the OCS Information Program are inside the front cover of this report.

2960 Electric Power

REFER ALSO TO CITATION(S) 43986, 44111, 44112, 45263

44041 **(EPRI-AP—2884-SR, pp 4.71-4.78) Electric utility intertie issues for small, dispersed power sources.** Reddoch, T.W.; Rizy, D.T. (Oak Ridge National Lab., TN). Feb 1983. NTIS, PC A11/MF A01. (CONF-8208121—). Contract W-7405-ENG-26.

From EPRI conference on solar and wind power - 1982 status and outlook; Providence, RI, USA (25 Aug 1982).

Utility intertie problems of small dispersed power sources are identified, particularly with regard to safety. The concept of dispersed storage and generation (DSG) intertie to the electric distribution system is described, safety concerns related to DSG interconnection are defined, and utility safety procedures are discussed. Guidelines for utility maintenance practices are given, and electric distribution system protection with DSG is discussed as well as distribution system design and generation control. (LEW)

44042 **(EPRI-EL—2835-Vol.4) Hierarchial power control center analyzer. Volume 4. Appendixes and bibliography. Final report.** Klein, S.; Staal, J. (Computer Sciences Corp., Falls Church, VA (USA)). May 1983. 151p. NTIS, PC A08/MF A01. Order Number DE83902598.

Portions are illegible in microfiche products.

Purpose of this project was to analyze the computer, communication, and system control processing and data distribution requirements of an electric utility dispatch control center. Research was also conducted into the application of satellite communication and real-time data base management in dispatch control centers. This report consists of four volumes: the Technical Manual, the User's Manual, the Programmer's Manual, and Appendices and Bibliography. These Appendices and Bibliography provide technical data augmenting the first three volumes.

44043 **(ESC-WR—82-05) Electric power production data bank: construction and some details.** Boonekamp, P.G.M. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Feb 1982. 39p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

This report contains a description of the electric power production data bank as it is used by the Energy Study Centre of the Netherlands Energy Research Foundation. In this data bank important data concerning the public electric power generation can be stored. At this moment only technical data, e.g. installed capacity per unit type, year of construction, total generation time, kind of fuel used and the electric power production per unit or utility are stored. It will be possible to store also economic data. A few examples are given.

44044 **(LA—9815-C) Summary of the workshop on regulatory-financial models of the US electric utility industry.** Ford, A.; Mann, G. (comps.). (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 69p. (CONF-8205202—Summ.). NTIS, PC A04/MF A01. Order Number DE83014773.

From DOE workshop on regulatory-financial models of the US electric utility industry; Los Alamos, NM, USA (26 May 1982).

On May 26-27, 1982, the US Department of Energy sponsored a workshop on regulatory-financial models of the US electric utility industry. Approximately 40 individuals met in Los Alamos, New Mexico, bringing together model builders and model users to increase their common understanding of the appropriate uses of the many different regulatory-financial models constructed during recent years. The summary is organized in ten sections following the schedule of the two-day workshop. The workshop began with two overview sessions, one devoted to a discussion of the results of

the Electric Power Research Institute's Utility Modeling Forum II and the second devoted to the results of model surveys by the Solar Energy Research Institute and the Los Alamos National Laboratory. The information from the forum and the two surveys covered over two dozen regulatory-financial models said to be useful for strategic planning purposes. Applications of several different models to regulatory and tax policy was the topic of detailed discussion in the next session, and model-based analyses of utility investment in conservation and load management was the focus of the second applications session. Six papers were presented to promote the discussion in these two important areas. The workshop concluded with a discussion of model management from an electric utility company's internal planning viewpoint, from the state regulators' viewpoint, and from the viewpoint of planners at the US Department of Energy.

44045 **Industrial electrification trend shows strength.** Burwell, C.C. (Oak Ridge Associated Universities, TN). *Electrical World;* 197: No. 5, 123-124(May 1983).

One outcome of the oil embargo and cartel has been that, on the average, the price ratio of electricity to oil and gas has been cut in half. Some observers of the electric-utility industry may consider this change unimportant as electricity is still four times as expensive as oil or gas based on dollars per delivered Btu. For numerous uses, however, a given amount of electricity can replace several times as much fossil-fuel energy when relative efficiencies are considered. Thus with decreasing cost ratio, electricity can be justified by certain processes where it was previously uneconomical. A study of industrial activity suggests that several large industries are poised for a substantial shift to electric processing. Among them are the steel, aluminum, copper, glass, cement, petroleum, and paper industries. The potential and incentive for further electrification, from a thermodynamic standpoint, are strongest in manufacturing sectors that require high processing temperatures. 2 figures.

2980 Consumption And Utilization

REFER ALSO TO CITATION(S) 43986, 44088

44046 **(ESC-WR—82-12) Industrial fuel use in relation to temperature.** Boot, A.H.; van Wees, F.G.H. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Feb 1982. 57p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

The fuel consumption in the Dutch industry is fairly well known. For the support of in-depth studies it was felt necessary to relate the fuel consumption and the process temperature in the Dutch industry. The most important conclusions of this study are: 1. in the Dutch industry most of the fuel use is for low temperature process heat (75%); 2. steam is the most important medium for heat transfer in the region between 150-200 degr. C.

44047 **(NZERDC—70-12-82) Total energy requirements of food retailing.** Patterson, M.G.; Earle, M.D. (Massey Univ., Palmerston North (New Zealand). Food Technology Research Centre). Dec 1982. 75p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83901723.

This study investigated the total energy requirements by supermarkets, groceries, dairies and butcheries in New Zealand. It is a part of the Food Technology Research Centre's ongoing research into total energy use in the New Zealand Food System. Base data were collected from a sample of 61 groceries and supermarkets, 25 dairies and 25 butcheries in Palmerston North. The mean annual energy consumption for supermarkets was found to be 1,228,000 MJ (+- 21%), for groceries 89,000 MJ (+- 9%), for dairies 51,000 MJ (+- 8%), and for butcheries 94,100 MJ (+- 18%). On a national basis, this direct energy use was estimated to be 611 TJ/yr. Electricity was found to be the main source of direct energy (94%), and refrigeration was found to be the main end-use (61%) of direct energy. The indirect energy requirements were estimated to be 19.5% of the total energy requirements. The total energy intensity (direct plus indirect) in supermarkets and groceries was found to be 1.47 MJ/kg for refrigerated food products and 0.29 MJ/kg for ambiently stored products; and in dairies was found to be 1.07 MJ/kg for refrigerated food products and 0.26 MJ/kg for ambiently stored products. The total energy intensity for butcheries was found to be 1.45 MJ/kg. The total energy intensities in the retail sector were lower than the energy intensities reported for the other steps in the food chain. The largest potential for energy conservation was found to be the improvement of the refrigeration equipment. It was estimated that 50% of the refrigeration energy could be saved by improving and increasing insulation, by improving compressor efficiency and by replacement of inefficient open top refrigeration units.

44048 **(NZERDC-P—67) Total energy requirements of shopping for food.** Patterson, M.G.; Earle, M.D. (Massey Univ., Palmerston North (New Zealand). Food Technology Research Centre). Dec 1982. 71p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83901725.

This survey investigated the total energy requirements of shopping for food in New Zealand. It is part of the Food Technology Research Centre's ongoing research into total energy use in the New Zealand food system. A sample survey of over 700 customers of 7 selected shops in Palmerston North was undertaken. An examination of the sample parameters and other factors indicate that the Palmerston North sample is probably representative of the national situation. However, there may be some need to verify this with other surveys particularly of large supermarkets. The primary objective of this survey was to determine representative energy intensities (MJ of energy per kilogram of food purchased) for the shopping step of the food chain. However, in the process much data were generated which may be of use and interest to a wider audience. These data include analysis of round trip distance, trip purpose, energy use per trip, characteristics of the shopping population, total transport cost of shopping, and purchase details. The mean energy intensity was found to be 13.21 MJ/kg (+- 7.7%). This energy intensity varied according to the shop type: Supermarkets (12.79 MJ/kg), Groceries (12.87 MJ/kg), Dairies (16.36 MJ/kg), Butcheries (16.35 MJ/kg) and Green groceries (7.17 MJ/kg). These energy intensities were found to very significantly according to the customer's sex and the shopping day. The total energy requirements of shopping for food in New Zealand were estimated to be 11.58 PJ/yr. Indirect energy requirements (energy embodied in the vehicles and transport infrastructures) were found to account for 63% of this total. The direct energy requirements (fuel) were estimated to be 4.3 PJ/yr ($70 million on 15 November 1981 costings).

2990 Unconventional Sources And Power Generation

REFER ALSO TO CITATION(S) 43437, 43476, 43477, 43478, 43506, 43513, 43542, 43641, 43643, 43653, 43661, 43663, 43666, 43667, 43668, 43677, 43678, 43718, 43970, 43985, 44108

44049 **(CONF-830583—3) Environmental implications of solar and biomass energy growth.** Habegger, L. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 14p. NTIS, PC A02/MF A01. Order Number DE83014337.

From American Association for the Advancement of Science annual meeting; Detroit, MI, USA (26 May 1983).

Portions are illegible in microfiche products.

As part of the US Department of Energy's Technology Assessment of Solar Energy projects, 26 solar and biomass technologies were characterized by size, energy requirements, pollutant discharges, and material and labor requirements for operation and maintenance and construction. Using these parameters, this paper compares these technologies with competing fossil and nuclear technologies. Comparisons are provided both for effects per unit of useful output energy and for national scenarios in which a mix of solar and biomass technologies displaces conventional energy options. The various direct environmental implications of using solar and biomass technologies are discussed. These implications include such factors as decreased atmospheric emissions from fossil-fuel use and increased soil erosion and emissions of particulate matter from biomass energy production. The extent to which conventional emissions reductions are offset by increases in indirect pollution from the higher materials-manufacturing requirements of solar technol-

ogies is quantitatively evaluated. Overall, only a limited national environmental advantage emerges from the postulated high growth rate of solar/biomass technology through the year 2000. Atmospheric emissions of particulate matter from biocombustion are disproportionately high and should be a major concern of regulators.

44050 **(DOE/CS/30607—T1) Active solar heating and cooling program analysis and reporting. Final technical report, 13 November 1980-31 January 1982.** McGovern, L. (International Business Services, Inc., Washington, DC (USA)). Jan 1982. Contract AC01-80CS30607. 47p. NTIS, PC A03. Order Number DE83014724.

Paper copy only, copy does not permit microfiche production.

In order to assist the Systems Development Branch in conducting analysis critical to program management, program planning, and budgetary planning, tasks under this contract included: designing and implementing procedures which permitted the effective utilization of existing data and documents in the development of draft program plans, draft budget reports, milestones/progress reports, and draft responses to program/project inquires; developing a procedure to assure that the most current information available in the Branch was easily retrievable to permit timely and accurate response to inquiries; designing management planning and information control systems to reflect the Branch's integration of program objectives and financial resources. These systems addressed the planning, monitoring, cataloging and reporting of programmatic and financial activities; conducting background research and analysis in order to provide the Active Systems Development Branch with information critical to the developent of program plans and budgets; and assisting in the data gathering and draft preparation of monthly program review materials, as well as providing input to annual reports such as the Program Planning and Budgetary System (PPBS) and the Business Management Information System (BMIS). Contract activities are reported along with cost management and contract management summary reports.

44051 **(DOE/SF/11549—T1) Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982.** Case, C.W. (Pacific Energy Technology, Inc., Sausalito, CA (USA)). Jul 1982. Contract AC03-81SF11549. 32p. NTIS, PC A03/MF A01. Order Number DE83015167.

This report describes the status of 18 of the 33 Department of Energy (DOE) Appropriate Energy Technology (AET) Projects on the US Pacific Islands (excluding the Hawaiian Islands) as of August 1, 1982. The projects include: shallow lens water pumping on the Marshall Islands; hydroelectric power systems on Micronesia; hospital solar hot water system on Micronesia; wind and solar equipment for the Aramas Kapw school in Micronesia; sail powered fishing boat in Micronesia; wind electric power project in Micronesia; smokeless cooking stoves in the Marshall Islands; demonstration programs in the Mariana Islands; typhoon-proof greenhouse on Guam; evaporative cooling for buildings in Guam, solar photovoltaic refrigerator in Micronesia; and a solar dryer demonstration in Micronesia.

44052 **(SERI/TR—231-1926) Alcohol fuels activities at the Solar Energy Research Institute, 1982.** (Solar Energy Research Inst., Golden, CO (USA)). Apr 1983. Contract AC02-77CH00178. 49p. NTIS, PC A03/MF A01. Order Number DE83009394.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The purpose of this report is to present and describe the SERI R & D activities in alcohol fuels during FY 1982. This report summarizes both in-house and contracted research tasks. Individual task summary sheets are included which report budget allocations, the objectives, and the technical approach. The major emphasis of the program is on cellulose-to-ethanol process development, with a smaller emphasis on methanol synthesis through gasification. To improve biological processing of biomass, the program also includes many of the long-lead-time, basic research tasks in such areas of recombinant DNA, genetics, and mutant strain selection.

44053 **Dauerhafte Energiequellen. Energiesparen, sinnvolle Energienutzung, Anwendungen von Sonnen-, Wind-, Wasser- und Bioenergie mit Bezugsquellen- und Buecherverzeichnis. (Long-term energy sources).** Rotarius, T. Lahntal, Germany, F.R.; Rotarius Verl. (1982). 232p. (In German).

With 180 figs.

The multiple and practical facilities for sensibly utilizing and saving energy are described: in households by architecture, thermal insulation, low-temperature heating and power-saving devices, by utilizing solar collectors and solar cells; in decentral unit power stations by cogeneration; in industry and traffic, by wind power; by hydroelectric power, in rural areas by utilizing manure, wood and straw for the production of biogas and heat. These remarkable application potentials and newly developed energy plans (enquete report and energy turning-point study) supply convincing arguments in favour of a safe, environmentally-minded and decentral energy supply without petroleum and nuclear power. Practical advice is given for home-mechanics, craftsmen, citizens' initiatives, politicians, farmers, teachers and other interested, with numerous figures and detailed recommendations for home-mechanics and buyer.

30 DIRECT ENERGY CONVERSION

3005 Fuel Cells

44054 (CONF-821211—Absts., pp 310-315) **Electrochemical and surface science research on fuel cells.** Srinivasan, S.; Maggiore, C.J.; Vanderborgh, N.E.; Hyde, P.J.; Hsueh, K.L.; Carubelli, A.; Derouin, C.R. (Los Alamos National Lab., NM). Dec 1982. NTIS, PC A15/MF A01.

From 5. DOE battery and electrochemical contractors' conference; Crystal City, VA, USA (7 Dec 1982).

44055 **(DOE/ET/11304—T8) High-temperature molten-carbonate fuel cells. Technical progress report, January-March 1978.** Baker, B.; Burns, D.; Dharia, D.; Herscovici, C.; Kinnibrugh, D.; Paetsch, L.; Patel, P.; Shah, C.; Yasi, J. (Energy Research Corp., Danbury, CT (USA)). May 1978. Contract AC02-76ET11304. 76p. (SAN—1196-8). NTIS, PC A05/MF A01. Order Number DE83014972.

Manufacturing procedures for nickel electrodes were developed using the hydrogen sintering furnace installed at ERC. Anode and cathode structures with the desired range of porosity and mean pore size were manufactured. Development of the in situ method of electrolyte preparation was continued. By improving various steps in the preparation procedure, we have attained an improved lithium aluminate product with a high rod-like β-lithium aluminate content. Reproducibility of the product is also considerably improved. Fabrication procedures for the electrolyte tile reinforced with the metal fiber screen have been established with very low rejection rates. Potentiostatic measurements of the corrosion current were made on both untreated and aluminized stainless steels in a reducing atmosphere. The aluminized stainless steels, in general, showed a much better corrosion resistance than the untreated steels. In small cell testing (8.56 cm^2), developments were as follows: a stable performance has been attained with the higher surface area nickel-cobalt anode for 700 hours, and endurance of the cell has been extended from 1000 hours to 3000 hours with a performance decay of less than 15 mV/1000 hours. Developments in large cell tests (270 cm^2) were: the Kanthal fiber screen reinforced tile was successfully thermal-cycled five times during the cell life of 1300 hours; endurance of a large cell has been extended from 1000 hours to 2000 hours; and tests of the sheet metal hardware have begun. So far, 500 hours of stable performance have been observed with the test continuing.

44056 **(DOE/NASA/0210—1) Task 4 completion report for 40-kilowatt grid-connected modification contract.** Vogt, J.H. (United Technologies Corp., South Windsor, CT (USA). Power Systems Div.). Jun 1983. Contract AI01-80ET17088. 39p. (NASA-CR—167950; FCR—4294). NTIS, PC A03/MF A01. Order Number DE83014588.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A 40-kW fuel cell driven onsite electric power plant was developed by the United Technologies Corporation for use in field testing to be conducted by the Utilities. The United States Department of Energy and the Gas Research Institute provided funding support for the development. An add-on package (Grid Connect Unit) was developed by UTC under the NASA contract to enable power plant operation in either a utility grid connected or stand alone mode. Results of the verification testing of the Grid Connect Unit modifications are reported in the Task 4 report which is defined as the final report. The report contains three distinct reporting areas: (1) power conditioner (Grid Connect Unit) verification test report; (2) verification test specification; and (3) analog data traces. The verification testing program was successfully completed.

44057 **(DOE/NASA/12726—20) Electrochemical rebalance cell for Redox systems.** Stalnaker, D.K. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). Jun 1983. Contract AI04-80AL12726. 14p. (NASA-TM—83363). NTIS, PC A02/MF A01. Order Number DE83015307.

An electrochemical rebalance cell for maintaining electrochemical balance, at the system level, of the acidified aqueous iron chloride and chromium chloride reactant solutions in the NASA Redox energy storage system was constructed and evaluated. The electrochemical reaction for the cathode is $Fe^{+3} + e^- \rightarrow Fe^{+2}$, and that for the anode is $1/2H_2 \rightarrow H^+ + e^-$. The iron (carbon felt) electrode and the hydrogen (plantinized carbon) electrode are separated by an anion exchange membrane. The performance of the rebalance cell is discussed as well as the assembly of a single rebalance cell and multicell stacks. Various cell configurations were tested and the results are presented and discussed. The rebalance cell was also used to demonstrate its ability, as a preparative tool, for making high-purity solutions of soluble reduced metal ionic species. Preparations of titanium, copper, vanadium, and chromium ions in acidified solutions were evaluated.

44058 **Low hydrostatic head electrolyte addition to fuel cell stacks.** Kothmann, R.E. (to Dept. of Energy). US Patent 4,383,009. 10 May 1983. Filed date 21 Sep 1981. vp. PAT-APPL-303810.

A fuel cell and system for supply electrolyte, as well as fuel and an oxidant to a fuel cell stack having at least two fuel cells, each of the cells having a pair of spaced electrodes and a matrix sandwiched therebetween, fuel and oxidant paths associated with a bipolar plate separating each pair of adjacent fuel cells and an electrolyte fill path for adding electrolyte to the cells and wetting said matrices. Electrolyte is flowed through the fuel cell stack in a back and forth fashion in a path in each cell substantially parallel to one face of opposite faces of the bipolar plate exposed to one of the electrodes and the matrices to produce an overall head uniformly between cells due to frictional pressure drop in the path for each cell free of a large hydrostatic head to thereby avoid flooding of the electrodes. The bipolar plate is provided with channels forming paths for the flow of the fuel and oxidant on opposite faces thereof, and the fuel and the oxidant are flowed along a first side of the bipolar plate and a second side of the bipolar plate through channels formed into the opposite faces of the bipolar plate, the fuel flowing through channels formed into one of the opposite faces and the oxidant flowing through channels formed into the other of the opposite faces.

44059 **Applied aspects of bioelectrochemistry: fuel cells, sensors, and bioorganic synthesis.** Turner, A.P.F. (Cranfield Inst. of Tech., Bedford, England); Aston, W.J.; Higgins, I.J.; Davis, G.; Hill, H.A.O. *Biotechnology and Bioengineering Symposium;* No. 12, 401-412(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Perfection of the interaction between redox proteins or intact microorganisms and electrodes will permit the construction of three classes of device: (1) low-temperature biofuel cells efficiently generating electricity from fuels and wastes; (2) a new generation of specific sensors based on direct electrode interactions rather than secondary detection of products or substrates of biological reactions; (3) bioelectrodes for electrochemical synthesis, where reducing equivalents, in the form of electrons are supplied directly to enzyme catalysts. This article reviews the authors' contribution to these fields and describes new work on the methanol dehydrogenase fuel cell. 8 figures, 3 tables.

32 ENERGY CONSERVATION, CONSUMPTION, AND UTILIZATION

44060 **(DOE/CS/64571—T2) Manager's guide to successful energy conservation.** (Synectics Group, Inc., Washington, DC (USA)). 31 May 1983. Contract AC01-81CS64571. 34p. NTIS, PC A03/MF A01. Order Number DE83014589.

The tasks involved in developing a successful energy conservation program, potential problem areas, and success stories documented in the field are described. Discussions are included on the following: energy and the organization, energy and management decisions, and management and the energy conservation process. (MHR)

3201 Buildings

REFER ALSO TO CITATION(S) 43552, 43565, 43604, 43606, 43607, 43608, 43610, 43611, 43622, 43627, 43633, 43641, 43644, 44099, 44101, 44113, 44114

44061 **(BNL—33292) Evaluation of the low-temperature heat-exchanger fouling problem. Phase I report. Literature review and work plan.** Butcher, T.A. (Brookhaven National Lab., Upton, NY (USA)). May 1983. Contract AC02-76CH00016. 52p. NTIS, PC A04/MF A01. Order Number DE83014769.

Portions are illegible in microfiche products.

This report describes Phase I of a study of the fouling of condensing heat exchangers in residential oil-fired boiler and furnaces. The first phase consists of a review of available information on soot information in residential systems and the preparation of a work plan for Phase II. In the literature review the effects of burner type, startup and shutdown, time from tuning, fuel quality, combustion chambers, nozzles, and fuel additives are discussed. While data are available on soot emissions with current burners and fuels there are limited data available on advanced burners and degraded fuels with modern burners. The Phase II work will provide an evaluation of the need for the development of advanced burner concepts for oil-fired condensing systems. Planned experimental work includes a furnace draft optimization study, extended fouling tests, a blue flame/yellow flame comparative test, and some degraded fuel teste.

44062 (CONF-800972—, pp 3.49-3.51) **Design of a passive solar multi-use addition for St. Mary's School.** Reeder, B.C. (St. Mary's School, Alexandria, VA). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30362.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The addition for St. Mary's School is for use as a gymnasium and auditorium. The concept involves two Trombe walls, two linear roof apertures, two storage pods, and a thermal storage floor slab. The system is designed to provide space heating, cooling, and daylighting. (LEW)

44063 (CONF-800972—, pp 3.52-3.54) **Design of passive commercial buildings.** Ternoey, S.E. (Solar Energy Research Inst., Golden, CO). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The Passive Commercial Building research being conducted by the Design Group, Building Systems Development Branch of the Solar Energy Research Institute is reviewed. This work includes four major tasks: (1) DOE Program Opportunity Notice (PON): Passive Solar Commercial Buildings Design Assistance and Demonstration; (2) Passive Commercial Building Data Base; (3) A Handbook; The Design of Passive Commercial Buildings; and (4) Design Integration/Design Methodology Research.

44064 (CONF-800972—, pp 3.57-3.58) **Super-insulated energy education center in Syracuse, New York.** Ashley, C.M.; Ashley, D.C.; Kinney, L.F.; Dike, G.A. (Syracuse Research Corp., NY). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30357.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The design of the building described makes full use of super-insulation, including berming, insulating shutters, and a positive heat exchange system for ventilation. A hybrid passive solar heating system is included that is expected to provide a large part of the heating requirement, and natural daylighting will reduce the lighting requirement. A substantial portion of the remaining energy requirement is expected to be provided by a wind generator. The air handling and thermal energy storage system is described and includes a rock storage bed designed to operate at low pressure drops. Daylighting is provided by reflecting sunlight onto the ceiling from a curved mirror. (LEW)

44065 (CONF-800972—, pp 4.25-4.26) **Rigid interior thermal window shutter.** Mitchell, R. (Robert Mitchell Solar Systems Design, Inc., Selkirk, NY). 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The objective of this project is to perfect and fabricate a low cost do-it-yourself thermal window shutter. Within the scope of this project, subcomponents of the shutter will be fabricated using some of the mass production technology expected for final commercialization. Mechanical and ease-of-assembly testing will be conducted to assess the potential penetration and to indicate future capitalization needs. Final plans will be generated for further steps in product commercialization.

44066 (CONF-800972—, pp 4.46-4.47) **Passive marketable products program automatic insulating roller curtain development.** Armstrong, P.R.; Davis, W.D. (Star Technology Corp., Carbondale, CO). 1980. NTIS, PC A16/MF A01. Contract FC02-80CS30532.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

The product being developed is a multilayer, motorized insulating curtain system. This report reviews the development work performed before and during the first month of the DOE contract, and outlines the work which remains.

44067 **(CONF-8204117—2) Controlled ventilation with heat recovery for residential buildings.** Zimmermann, H. (Gustav Hensel KG, Hannover (Germany, F.R.)). 1982. 25p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770138.

From Energy conference within the context of the Hannover Fair; Hannover, F.R. Germany (21 Apr 1982).

Portions are illegible in microfiche products.

The construction of joint-light and thermally insulated buildings has become more and more a standard with us. However, it must be said that the claim of a thermal insulation with joint tightness upon energy conservation and thus cost minimization gets lost if at the same time there is no controlled ventilation system which also offers the possibility of heat recovery.

44068 **(DOE/CS/20531—T1) Building energy code input form with instructions for completion.** Kroner, W.M. (Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research). Jun 1980. Contract AC01-79CS20531. 75p. NTIS, PC A04/MF A01. Order Number DE83015065.

Portions are illegible in microfiche products.

This code input form is a format with instructions for expressing data required for the equivalency demonstration program. It is requested that information be provided regarding the administrative and technical provisions embodied by the condidate building energy code, climate conditions of the areas for which the code is mandatory, and the volume of construction in the state or locality. The format for providing this required information is organized according to the following sections with instructions and supplementary information provided as necessary: administrative information; general requrements; design conditions; design trade-offs; building envelope requirements; HVAC requirements; service water heating; and electrical power and lighting for the convenience of the code official, the following three appendices are also provided: SMSA locations; building classifications; and standard rating conditions.

44069 **(DOE/CS/20531—T2) Building energy performance standards, Phase III. Reference building set to be used as a vehicle for testing energy-code equivalency. Preliminary draft.** (Ehrenkrantz Group, New York (USA)). 20 Mar 1980. Contract AC01-79CS20531. 116p. NTIS MF A01. Order Number DE83015067.

Microfiche only, copy does not permit paper copy reproduction.

This preliminary draft report describes the process and results of an activity intended to identify a set of buildings which would provide a fair basis for testing the equivalency between existing ASHRAE 90 based state energy codes and the proposed BEPS requirements. The requirements for building classification originating in the existing state energy codes and in the BEPS NOPR are described. The numerical and judgemental factors used in the selection of the Reference buildings are described and the buildings selected are illustrated. Comprehensive descriptions of the selected buildings are currently being prepared.

44070 **(DOE/CS/20531—T3) Building energy performance standards. Phase IV. Code parameter list and code format listing.** Kroner, W.M. (Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research). Jun 1980. Contract AC01-79CS20531. 17p. NTIS, PC A02/MF A01. Order Number DE83015063.

This work product presents a summary description of the energy code input data considered for the equivalency demonstration program. The output of this task was used in developing the Building Energy Code Input Form, and in determining the DOE-2 capability for representing code specifications for the simulation of Design Energy Consumption (DEC). The Definition/Classification of code descriptors are presented. All building code elements that affect energy use were identified. Each of the code elements was defined and described in terms of its effect on energy use, units, mappability into DOE-2 input, etc.

44071 **(DOE/CS/20531—T4) Evaluation of building-code descriptors.** Kroner, W.M. (Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research). Jun 1980. Contract AC01-79CS20531. 53p. NTIS, PC A04/MF A01. Order Number DE83015064.

The purpose of this program is to demonstrate an equivalency methodology related to the implementation of energy performance standards for new residential and commercial buildings. State and local building code data is used to determine if there is equivalency between the Design Energy Consumption (DEC) of buildings designed under the code and the Design Energy Budget (DEB) levels proposed by the Building Energy Performance Standards (BEPS) program. A code input form is developed through which State and local code agencies can submit data about their energy codes and other related information to determine code equivalency. In developing the code input form, building energy code specifications from existing energy codes, as identified in the Code Parameter List and Code Format Listing were considered. This report identifies those code specifications which are included on the code input form and documents the approach used in evaluating each of the specifications. This report documents decisions of the entire project team involved with the demonstration of equivalency program; these decisions followed review of both technical and policy issues.

44072 **(DOE/CS/20531—T5) Development of a building energy-code input form.** Kroner, W.M. (Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research). Jul 1980. Contract AC01-79CS20531. 88p. NTIS, PC A05/MF A01. Order Number DE83015069.

Portions are illegible in microfiche products.

Research is reported on the development of a building energy code input form for expressing state and local building energy code provisions to determine whether an energy code meets or exceeds the requirements of the federal building energy performance standards. Following an introduction and definitions, the methodology is described in detail for developing a demonstration of code equivalency. The equivalency process determines whether the average impact on energy use of the state or local energy code is equivalent to the average impact on energy use of the Building Energy Performance Standards (BEPS); it does not demonstrate the absolute equivalency of the components of each standard. The code parameter list, building code descriptors evaluation, building energy code input form, and DOE-2 program input are then explained. Appendices include: (1) code parameter list and code format listing; (2) evaluation of building code descriptors; (3) building energy code input form with instructions for completion; and building code descriptors translated for input to the DOE-2 program.

44073 **(DOE/CS/20531—T6) Building energy performance standards. Phase III. Selection of the reference building set.** (Ehrenkrantz Group, New York (USA)). 3 Mar 1980. Contract AC01-79CS20531. 88p. NTIS, PC A05/MF A01. Order Number DE83015066.

Portions are illegible in microfiche products.

The reference building set, selected for sensitivity analysis and equivalency testing, was derived from the Phase II sample of commercial/multifamily buildings and the single-family residential reference buildings. The reference building selection procedure is described in two parts, Part I consists of the commercial/multifamily reference building selections, and Part II details the single-family residential reference building selections.

44074 **(DOE/CS/22804—2) Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience.** Klepper, M.; Sherman, J. (Lane and Edson, P.C., Washington, DC (USA)). Jun 1983. Contract AC02-81CS22804. 278p. NTIS, PC A13/MF A01. Order Number DE83015723.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This report is the third phase of a three phase project to: (1) identify and finance energy efficiency improvements in commercial, multifamily, and industrial buildings; (2) develop the model documents needed to implement selected financing mechanisms in each of the previously mentioned building sectors; and (3) demonstrate the use of the financing mechanisms through actual field tests and disseminate the results to a variiety of entities who would be able to stimulate the marketplace and encourage private sector financing of energy conservation improvements in commercial multifamily and industrial buildings. One of the underlying premises of this project has been that the pace of energy efficiency investments would increase dramatically if attractive financing mechanisms were readily available to property owners, energy users, manufacturers of energy efficiency equipment, etc. At present, energy efficiency investments compete with other business opportunities for limited corporate resources. Innovative financing mechanisms permit building owners to obtain cost savings from energy efficiency measures without making any capital investments. In other words, the energy measures pay for themselves. These financing mechanisms also do not require any continuing governmental involvement or subsidy. An attempt was made to demonstrate the attractivenss of third party financing of energy efficiency improvements in multifamily, commercial and industrial buildings to stimulate the marketplace, draw attention to the feasibility of third party financing and provide a working model for engineering firms, energy service companies, leasing firms and other entities to duplicate.

44075 **(DOE/CS/28701—T1) Results of the test application of the Process Standard.** (Naramore, Bain, Brady, and Johanson, Seattle, WA (USA)). 7 Aug 1978. Contract AC01-77CS28701. 91p. NTIS, PC A05/MF A01. Order Number DE83008150.

Portions are illegible in microfiche products.

The purpose of this test was to develop an energy efficient design for a new Electronics Building using the Process Standard for the Design of Energy Efficient Federal Buildings as a guideline. The selected building is a part of the National Oceanic and Atmospheric Administration's (NOAA) Western Regional Center at Sand Point in Seattle, Washington. The result of this process is the development of a building and environmental systems which achieves an optimum balance between energy consumption, life cycle cost, and building usage. During the course of the design, several architectural and mechanical options were considered. The selected schematic design was based on the procedure utilizing life cycle cost analysis as outlined in the Process Standard. With the building envelope and Mechanical and Electrical systems finally conceived for the subject building, the total yearly energy consumption of the building was estimated to be 3.13 x 10^9 Btu/y or 86,830 Btu's per gross square foot per year. This report includes the schematic phase plus the predesign energy conservation analysis required by the Process Standard. Included in the predesign information are the results of the Energy Data Development phase, the Occupancy/Climate Analysis and the Energy Conservation Opportunity Analysis.

44076 **(DOE/CS/40240—T1) Commercialization of the power-factor controller. Final report.** Yrisarri, E. Jr. (INVECO, Inc., Huntington Beach, CA (USA)). 15 Apr 1981. Contract AI01-79CS40240. 363p. NTIS MF A01. Order Number DE83014470.

Microfiche only, copy does not permit paper copy reproduction.

The following phases of the design program are discussed: power factor, the motor power control concept, theory of operation, salient technical guidelines of motor power controllers, benefits, the motor power controller vs capacitors, sudden load changes, neutral connection, cost effectiveness, payout, large scale applications, uses, cost, marketing, and test data.

44077 **(ESC—16) Energy conservation in buildings.** van Dijkum, P.H.; Kram, T. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Dec 1981. 136p. (In Dutch). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770230.

Portions are illegible in microfiche products.

Methodologically, two different approaches have been used. First a pay-out model has been developed to evaluate the market penetrations of different technologies in different markets. Then a simulation model is used to calculate the effects of introducing these technologies consecutively into the Dutch energy system. The latter model simulates the effects of the introduction of conservation technologies not only in the demand sectors but also in the conversion and primary sectors of the energy system. The simulated effects include total primary energy conservation over the period 1980-2000, benefit/cost ratios over the same period and annual primary energy conservation per m3 volume of buildings. A limited analysis of employment effects has also been carried out. The results indicate that it is possible to conserve about 110 x 10 exp(9) m3 primary natural gas equivalents over the period 1980-2000 by introducing technologies with a positive benefit/cost ratio. This means that problems of rentability, require attention. The extra investments amount to Hfl. 31 x 13 exp(9) expressed in 1980 guilders. It is possible to conserve about 2900 m3 primary natural gas equivalents per dwelling by application of a coupled production system. The extra employment necessary for installation and maintenance of the technologies in the residential sector equals 370 x 10 exp(3) manyears over the period 1980-2000.

44078 **(EUR—7281-EN-Annex) Frosting and defrosting behaviour of outdoor coils of air-source heat pumps. Final report, figures.** Bouma, J.W.J. (Commission of the European Communities, Brussels (Belgium)). [nd]. 44p. European Community Information Service, (ECIS), 2100 M Street NW, Suite 707, Washington, DC 20037.

44079 (EUR—8370-EN/FR) Main characteristics of housing permitting reduced energy consumption for heating. Final report. Heikhaus, H.; Lebrun, J.; Laret, L. (Centre Scientifique et Technique de la Construction, Brussels (Belgium); Liege Univ. (Belgium). Lab. de Physique du Batiment). 1983. 282p. European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 8629500.

Main text in French with English summary.

The main results of the research presented consist in: an enormous amount of experimental data collected on the reduced scale models and on the corresponding micro-climate during nearly three years in Limelette; a detailed statistical analysis of the energy consumed by the (continuously) heated models as function of the corresponding temperatures of the unheated ones; some more-limited analysis of the dynamic behavior of the heated (continuously and intermittently) and unheated models; a detailed comparison of different solar-radiation calculation methods among themselves and with the numerous measurements realized on site; a proposal of practical estimation of the ground losses; a practical method to estimate the heating energy demand through tables of equivalent degree-days; a second-order dynamic approach which could easily be used in many practical problems; and a statistical analysis of Belgian meteorological data which allows a rational choice of the heating design temperature. As the calculation of equivalent degree-days, their analysis could easily be transposed to any other climate.

44080 (EUR—8461-FR) CO_2-based ventilation in buildings. Thellier, F.; Grossin, R. (Societe Bertin et Compagnie, 78 - Plaisir (France)). 1983. 110p. (In French and English). European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037.

A new energy-conservation technique based on the control of the fresh air intake through measurement of CO_2 content in extracted air was examined for different kind of buildings (houses, offices, stores, show-rooms). Analysis of air contaminants showed that CO_2 was the most satisfactory air quality parameter for ventilation control. Various techniques for measuring CO_2 concentration were examined in view to design a low cost sensor (around 200 US $); this led to the conclusion that only infrared absorption technique was able to meet the requirements of a use in habitat. Computational simulation was performed in order to determine annual energy savings with regard to standard ventilation rates; a technicoeconomic analysis showed that a CO_2 based ventilation system could provide a twice better pay-back period than an air-in/air-out heat exchanger recuperator. Future development of CO_2-based ventilation system is promising, more especially as an enquiry made within European CO_2 sensor manufacturers has shown they could design and produce CO_2 appliances at a market price around 200 US $. Before developing such a device, it is necessary to experimentally ascertain the figures in energy saving yielded by the numerical simulation; carrying out an experiment in actual conditions will also give the manufacturers the level of performance required for the sensor to achieve a fair energy saving/comfort compromise.

44081 (LBL—14914-Rev.) Technical issues for building energy ratings. Rosenfeld, A.H.; Wagner, B.S. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 17p. (CONF-820849—19-Rev.). NTIS, PC A02/MF A01. Order Number DE83014856.

From Summer study in energy efficient buildings; Santa Cruz, CA, USA (22 Aug 1982).

Portions are illegible in microfiche products.

Current market practice in building energy efficiency lags far behind current cost-effective conservation practice, in part due to lack of credible information about how energy efficient homes are, compared to similar houses, and how much more energy and dollars could be saved for a specified additional investment. We show that, given the current spread in building efficiencies, the differences in energy efficiency between houses on the market may typically be worth on the order of $2500, and in some cases more. We show that building energy efficiency ratings are an attractive tool for providing this information. We discuss the requirements for rating accuracy, some technical issues involved in designing a rating, and suggest a certification process for rating tools and users.

44082 (LBL—15305) Holographic window coatings for solar control and daylighting: assessment report. Hunt, A.J. (Lawrence Berkeley Lab., CA (USA)). Nov 1982. Contract AC03-76SF00098. 28p. NTIS, PC A03/MF A01. Order Number DE83014797.

Control of sunlight passing through windows based on the diffraction of light is investigated. In this approach, holographic optical elements (HOE's) intercept sunlight and diffract it in a desired direction. As a window coating that may be applied to an existing structure, a HOE can provide angular acceptance or rejection of the incoming sunlight, it can direct sunlight deeply into a room to provide task lighting, and it can select the portion of sunlight with the greatest visual efficacy. Possible uses include daylighting, sunlight control and rejection, and solar heating. (LEW)

44083 (NP—3770187) Evaluating of movable thermal screens with regard to the heat consumption of greenhouses. Meyer, J. (Hannover Univ. (Germany, F.R.). Inst. fuer Technik in Gartenbau und Landwirtschaft). 1982. 145p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770187.

Portions are illegible in microfiche products.

Installation of movable thermal screens has become one of the most important and most frequently used energy-conserving measures. Existing glass-houses can be equipped with them at relatively low cost, light reduction are kept low by leaving the screens open during the day, eventually occuring negative climatic changes are limited to the times when the screen is closed. The efficiency of a movable thermal screen depends vitally on the screen material and the quality of the sealings.

44084 (NP—3902856) Russian fireplace: demonstrations and workshops. Final report, January 1, 1980-January 31, 1981. Jarpe, J.S. (New Mexico Univ., Albuquerque (USA). New Mexico Energy Inst.). May 1981. 91p. (EMD—2-68-1108). New Mexico Energy and Minerals Dept., P.O. Box 2770, Santa Fe, NM 87503.

Eight masonry stoves, more commonly described as Russian fireplaces, were constructed in public buildings throughout New Mexico. Each unit was built in a workshop environment to show interested masons and alternative energy users the fabrication techniques. The designs evolved with the last being superior to the first in simplicity and integrity. Veneers of adobe, concrete block, slump block, and brick were used. Thermal cracking is a problem with the three latter materials. An air space between the inner firebrick and outer veneer along with a high lime mortar mix has alleviated the propensity of these materials to crack. The door is fabricated in a manner that corrects problems in this area. Each fireplace was instrumented with thermocouples during construction. An efficiency test(s) was conducted at each installation with a resulting overall spread of 85.6% to 89% from the worst to the best. The average efficiency is 87.6%. All heat losses from the flue during combustion and subsequent standby losses between firings and the losses due to combustion are accounted for. The thermal lag of the materials, heat input to the building, and ability of the materials to maintain useful surface temperatures were measured. Adobe can maintain the peak output longer, while the lighter veneers are more controllable.

44085 (PNL—4725) Information manual for the institutional conservation program. Franklin, A.L.; Wilfert, G.L.; Lee, V.E. (Pacific Northwest Lab., Richland, WA (USA)). May 1983. Contract AC06-76RL01830. 146p. NTIS, PC A04/MF A01. Order Number DE83015180.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Application for funding through the Institutional Conservation Program includes a technical assistance (TA) application/report. It provides the building owner or manager with a useful document describing the physical and operating characteristics of a building and provides recommendations and supporting information for potential modifications that will reduce energy consumptions. Legal and practical requirements constraining the TA report are discussed, including a summary of legal constraints as established in the Federal Register. The practical requirements that make the TA a useful document are covered. The scope and content of a TA

report are discussed. Included are summary listings of broad areas that need to be addressed in a complete TA report, followed by detailed discussions of each area. A sample TA report is appended. (LEW)

44086 **(PNL—4764) Evaluation of the home-energy-rating concept and the Massachusetts Pilot Project.** Frankel, M.L.; Duberg, J.A. (Centaur Associates, Inc., Washington, DC (USA)). Jun 1983. Contract AC06-76RL01830. 115p. NTIS, PC A06/MF A01. Order Number DE83015358.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This is a report on the results of an evaluation of a home-energy-rating concept based on a Massachusetts pilot project. The focus of the evaluation was on: (1) the compatibility of the Massachusetts rating with the RCS program, (2) who would use the rating and how, (3) qualitative estimates of benefits and costs, and (4) recommendations for further use and testing of the rating. In addition the evaluation of the rating concept also attempted to determine what if any effect the home energy rating has on the demand for energy audits, on the propensity of customers who received ratings to undertake recommended energy-efficiency home improvements, and on changes in mortgage-lending procedures for energy-efficient homes. The evaluation consisted of telephone and in-person discussions with the project developers, the various professional user groups, the recipients of the energy ratings, and control groups of audit customers that did not receive the energy rating. The evaluation was designed to determine the results of the pilot project, assess the project's effectiveness, and analyze the potential for transferring the rating procedure to other geographic locations.

44087 **Calculating heat transfer through windows.** Rubin, M. (Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *International Journal of Energy Research;* 6: No. 4, 341-349(Oct 1982).

To calculate the energy performance of buildings, one must know the heat-transfer characteristics of the windows as functions of environmental variables, such as temperature and wind speed. Window designs are becoming more complex in response to the need for energy conservation. In this paper, the authors develop a general procedure for calculating the net energy flux through the glazed area of a window composed of an arbitrary number of solid layers. These layers, which may have thin-film coatings, can have any specified solar and thermal radiation properties and enclosed spaces between solid layers can contain either air or other gases. Results are compared with experimental measurements of heat flow using a calibrated hot-box.

3202 Transportation

44088 **(CONF-8305104—1) Energy consumption in road transport: data-collection requirements.** Millar, M.; Bernard, M.J. (Argonne National Lab., IL (USA)). 3 Jun 1983. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01. Order Number DE83014737.

From Panamerican Transport Congress meeting; Buenos Aires, Argentina (31 May 1983).

Despite recent softening in world oil prices, oil imports continue to represent a serious drain on the foreign-exchange reserves of many countries. As a result, governments throughout the world are pursuing a variety of policies - from increased exploitation of indigenous resources to conservation and other improvements in energy-conversion efficiency - in an effort to reduce their reliance on imported oil. Road transport, representing upwards of 30% of petroleum-product consumption in many countries, represents a logical target for such efforts. However, beyond the gross statistics available from oil company records on fuel sales, oftimes little is known about precisely how this sizeable quantity of fuel is consumed. Without more specific data on the modal composition of road-transport demand, the energy-conversion characteristics of the vehicles serving that demand, the operational features of those vehicles, etc., governments cannot hope to develop the conservation programs so urgently needed. Data on road freight are particularly sparse and, given the developing supply/demand imbalance for middle-distillate fuels, current data gaps may well develop into future supply shortages or cross-subsidization issues. Since the mid-1970s, most of the nations of North and South America have mounted programs to collect data on the energy-consumption characteristics of road transport. This paper reports on one such effort now underway in Jamaica. While certain of the transportation and data-collection issues which influenced methodology selection may be unique to that country, others are common to many countries at similar levels of urbanization, motorization, and income. With appropriate modification to account for distinctive local conditions, the Jamaican data-collection procedure has broad applicability, in whole or in part, to a variety of national and regional contexts.

44089 **(CONF-8305104—2) Identification and condenstion of railway fuel-savings measures and strategies.** Saricks, C.L.; Bertram, K.M.; Smith, J.E. (Argonne National Lab., IL (USA)). 3 Jun 1983. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01. Order Number DE83014738.

From Panamerican Transport Congress meeting; Buenos Aires, Argentina (31 May 1983).

This paper documents the results of a project undertaken by the Center for Transportation Research of Argonne National Laboratory to accomplish the following objectives: (1) assemble reliable and current information available in published or unpublished form on measures to conserve petroleum fuel in the United States rail carrier industry; (2) update and, as necessary, revise this information based on direct interaction with experts in the rail industry, government, and academia; and (3) prepare and distribute throughout the US rail industry a concise, comprehensive summary of this information in the format of a chart, or matrix of fuel saving measures. The final product of this project, a Rail Energy Efficiency Measures Matrix (hereafter, the matrix), was distributed to over 120 United States domestic rail carriers late in 1982. Central to the effort expended in developing this matrix, and indispensable to its content, was a meeting held in Chicago, Illinois, in February 1982 to coordinate the views and findings of railway operations supervisors, fuel conservation officers, and researchers from both the rail industry and US universities. The discussions which follow present the organizational format of the matrix, its component elements (fuel savings measures and strategies), and important contrasts regarding these elements between information found in the literature the collective viewpoint of the experts who attended the February 1982 meeting. A final section presents the measures found to be most important by consensus of these experts.

44090 **(NP—3770004) Energy utilization in the transport of gardening products.** Merholz, K. (Hannover Univ. (Germany, F.R.)). Apr 1981. 88p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770004.

Portions are illegible in microfiche products. Diploma thesis submitted to Hannover Univ. (Germany, F.R.).

Up to now numerous investigations on the climatic advantages of Southern sites for cut flower production, plant and vegetable production have been worked out. However, a detailed investigation on the energy utilization in the transport of gardening products is still missing. It is the very transport sector which requires a lot of energy, depending on products and means of transportation applied, and which can thus destroy the advantage of a climatically and ecologically suitable site which is far away from the marketing area. The knowledge of the energy consumption in transport is a basic component of an energetic input/output analysis of a production and marketing system in gardening.

44091 **(NP—3770139) Aviation fuels - today and tomorrow.** (Deutsche Shell A.G., Hamburg (Germany, F.R.). Abt. Information und Presse; Shell Austria A.G., Vienna; Shell Switzerland, Zurich). Nov 1982. 12p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770139.

In 1981 some 100 million tonnes of aviation fuels were consumed outside the socialist states. 99% of this was kerosene for jet planes. There was only a very low demand for gasoline as fuel for piston-engine aircraft. If the demand for jet fuel will continue to increase throughout the Eighties, supply problems may arise, due to the fact that kerosenes are middle distillates which are urgently needed also in other industrial branches.

3203 Industry And Agriculture

REFER ALSO TO CITATION(S) 43189, 43206, 43218, 43431, 43457, 43541, 44025, 44045, 44076, 44090, 44689

44092 (BMFT-FB-T—82-202) Minimizing the energy consumption of industrial furnaces during the heating process by controlling the furnaces using reliable mathematical models and by optimizing necessary cooled supports. Woelk, G.; Roehrlich, H.; Knaak, R. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1982. 197p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750198.

Portions are illegible in microfiche products.

A program system has been developed to operate a milling furnace automatically. To simulate the furnace behaviour two mathematical models are necessary, one to calculate the momentanous temperatures, the other one to calculate the necessary end temperature . An adaptation algorithm computes the real heat transfer conditions. To check out the program system an experimental push furnace and a special process computer with master-slave-structure has been built. The results show the capability of the program system to control the furnace. When using this system the energy necessary to operate the furnace can be lowered by at least 5%. An investigation into influence of the skit in push and lifting beam furnace shows that the influence of the slide-contact is much larger than the influence of the energy flow per surface area. Using an optimal height of the sliding contact will save a large amount of energy.

44093 (CONF-8204117—3) New solution of energy problems for industrial operation by cogeneration. Brandes, H. (Ruhrkohle A.G., Essen (Germany, F.R.)). 1982. 21p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770184.

From Energy conference within the context of the Hannover Fair; Hannover, F.R. Germany (21 Apr 1982).

The article deals with technical requirements which modern process heat plants have to meet and then refers to some modern firing technologies for coal.

44094 (DOE/CE/40590—T1) Review of a report Industrial Cogeneration Potential (1980 to 2000). Phase II. Peer review and application of a data base. (Vineta, Inc., Falls Church, VA (USA)). 22 Feb 1983. Contract AC01-82CE40590. 31p. NTIS, PC A03/MF A01. Order Number DE83008147.

Portions are illegible in microfiche products.

This paper investigates the potential value of the Industrial Plant Energy Profile (GEA/IPEP) owned by the General Energy Associates (GEA) to serve as a data base for the prediction of the industrial cogeneration potential. A preceding report presented a critical review of the methodology applied by GEA in their report entitled Industrial Cogeneration Potential (1980 to 2000). In its conclusions, this paper will describe three major factors in the GEA report, which will adversely affect their findings regarding the future potential for industrial cogeneration. The paper will further make a number of recommendations conducive to a more stringent application of the data base leading to a realistic assessment of the future cogeneration potential.

44095 (DOE/CS/15013—T1) Development of a commercial feasible application of a hydrostatic meat tenderizer and demonstration of its efficacy. Final report, June 24, 1980-March 1, 1983. Elgasim, E.A. (Oregon State Univ., Corvallis (USA). Clark Meat Science Lab.). May 1983. Contract FG01-80CS15013. 14p. NTIS, PC A02/MF A01. Order Number DE83011612.

Prerigor pressurization procedure involves hot-bonding, vacuum packaging the boneless cuts and subjecting them to 15,000 psi of water pressure in a closed chamber for two minutes. The pressure treatment causes a massive linear contraction of the muscle fibers which disrupts the fine connective tissue and consequently weakens the muscle, which is synonymous with tenderizing. Treated muscles, when compared to untreated muscles from the same carcass have been found to have longer storage life, brighter color, longer case-life and to be equal if not superior in nutritional value. The study demonstrated beyond doubt the beneficial effect of prerigor pressurization. Meat processed in this manner will occupy less space in the cooler and during transportation, and needs no aging, thus it is likely to result in less energy consumption.

44096 (DOE/ET/10415—T6) Development of potential uses for the residue from fluidized-bed-combustion processes. Final report covering results of research program and recommended practices for potential users. Minnick, L.J. (Minnick (L. John), Plymouth Meeting, PA (USA)). Dec 1982. Contract AC21-77ET10415. 131p. NTIS, PC A07/MF A01. Order Number DE83012575.

The following topics are covered: sources and characterization of spent bed material and fly ash; conditioning and beneficiation of residue; handling, storage, and transportation of materials; guidelines for direct use of atmospheric fluidized-bed residue in a commercial application; production of synthetic aggregate; and treatment and disposal of trade wastes. (MHR)

44097 (EGG—2265) Analysis and reduction of degradation of working fluid in the Sundstrand Organic Rankine-Cycle System. Berger, R. (Sundstrand Corp., Rockford, IL (USA). Sundstrand Energy Systems). Jul 1983. Contract AC07-76ID01570. 217p. NTIS MF A01. Order Number DE83014960.

Microfiche only, copy does not permit paper copy reproduction.

Studies on understanding the location and construction levels of oxygen in the organic Rankine cycle (ORC) unit and establishing a rate of degradation with time for toluene in an operating ORC system are presented. Work on identifying the compounds in degraded toluene and contamination removal is discussed. (MHR)

44098 (ESC—21) Temperatures of industrial process heat. Boot, A.H.; van Wees, F.G.H. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). [nd]. 59p. (In Dutch). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770212.

Portions are illegible in microfiche products.

A study of the temperatures of industrial process heat in the Netherlands is described. A database is available on the energy input of industrial processes. By assigning a temperature level of energy end-use to each of these processes, it becomes possible to calculate the relative energy input at different temperatures for the total industrial use as well as for individual industrial sectors. The results show that approximately 55% of all energy used is in the temperature range of 100 to 200 degrees C (about 20% from 200-400 degrees C). This illustrates the high theoretical potential for energy supply technologies such as co-generation, solar energy, heatpumps and geothermal energy.

44099 (ESC-WR—82-15) Industrial fuel applications. Furnaces and dryers. van Wees, F.G.H.; Smiers, L. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). May 1982. 97p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

In preparation for a study to the industrial fuel consumption in relation to the temperature level, information for different energy and constructive aspects of the applied furnaces and dryers has been collected. Where possible is given, at which temperature the process takes place. In relation to the effort to an increase of the use of coal at the industry, in the same time it has been investigated, at which way coal could be combusted at furnaces and dryers. A documentation of the different furnaces and dryers has been given.

44100 **(FHWA/RD—82/167) Kiln dust-fly ash systems for highway bases and subbases.** (Valley Forge Labs., Devon, PA (USA)). Oct 1982. Contract AI01-79CS40293. 137p. NTIS, PC A07/MF A01. Order Number DE83014355.

Portions are illegible in microfiche products.

The purpose of this investigation was to determine the effectiveness of substituting kiln dusts for hydrated lime in lime-fly ash-aggregate road base systems. A total of 45 kiln dust samples, including 33 cement dusts and 12 lime dusts, were obtained in accordance with a standard sampling procedure. In addition, 18 fly ashes (including 5 Class C ash samples) and 6 aggregates were included in the sampling program. Kiln dust and fly ash samples were characterized by Trow, Ltd. to determine physical properties and chemical, as well as mineralogical, composition. Optimum kiln dust-fly ash ratios were developed for 66 mix combinations. Kiln dust-fly ash-aggregate compressive strength tests were performed. Engineering properties (durability, volume stability, etc.) of optimum mix combinations were tested and compared with conventional lime-fly ash-aggregate mixtures. Most kiln dust-fly ash-aggregate mixes were comparable to, and in many cases demonstrated higher early strength development than, lime-fly ash-aggregate mixes. Optimum mix strengths for kiln dust-fly ash-aggregate compositions were generally attained at kiln dust-fly ash ratios of 2:1 using cement kiln dust and 1:1 using lime kiln dust. By contrast, most lime-fly ash-aggregate mixes have lime-fly ash ratios of 1:3 or 1:4. Therefore, higher concentrations of kiln dust are required compared to commercial lime. Mixes containing Class C fly ash developed higher strengths than comparable mixes with Class F fly ash.

44101 **(NP—3770142) Rational energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Pt. F.** Biasin, K.; Dreisbach, K.; Fruehauf, H.J.; Bouillon, H.; Jensch, K.; Pentenrieder, J. (SEE CODE- 9699470 Energietechnik G.m.b.H., Essen (Germany, F.R.). Studiengesellschaft fuer Energieumwandlung, -Fortleitung und -Anwendung). [nd]. 86p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770142.

Portions are illegible in microfiche products.

The three operated ground source heat exchangers of the test plant at Wiehl have been recorded by means of measuring systems and investigated as for their qualification as heat source and heat accumulator. The individual systems differ mainly with regard to the laying depth and laying density of the tube coils.

44102 **(PNL—4734) Economic and energy audit of converting waste plastics to oil. Final report.** Machacek, R. (Little (Arthur D.), Inc., Cambridge, MA (USA)). Jun 1983. Contract AC06-76RL01830. 34p. NTIS, PC A03/MF A01. Order Number DE83015022.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A new technology was developed for converting the waste atactic resin to liquid fuel. The first commercial-scale demonstration/development unit (17 million pounds per year atactic resin feed) was built on a cost-sharing basis by Procedyne, USS Chemicals, and the US Department of Energy at the polypropylene facility of USS Chemicals in La Porte, Texas. The unit has been operating in its present modified form since March 1982. An economic analysis and energy audit on Procedyne Corp.'s pyrolysis process was conducted. The study considered the technical feasibility, reliability, energy savings, and economic incentives of the process.

44103 **(PNL—4770) Economic and energy audit of textile foam processing.** Machacek, R. (Little (Arthur D.), Inc., Cambridge, MA (USA)). Jun 1983. Contract AC06-76RL01830. 91p. NTIS, PC A05/MF A01. Order Number DE83015020.

Conventional wet processing of textiles - dyeing, or application of such surface finishes as soil and water repellents, antistatic agents, fire retardants, permanent press agents, and starch - consumes about 0.19 quadrillion Btu's of energy per year, the equivalent of 30 million barrels of oil. Because wet processing involves immersion of the fabric in a water bath, most of the energy used is in the form of heat for drying. In the newer foam finishing approach, the chemicals for surface finishes are dispersed in a mixture of water and air. The chemicals are concentrated in a relatively small amount of water, and air is injected to form a thick, stable foam. Because little water is involved, drying time and temperature may be drastically reduced. Authur D. Little, Inc., conducted an economic and energy audit of foam processing that considered the technical feasibility, reliability, energy savings, and economic incentives for using foam finishing. We monitored four plants that finish textiles (carpets, broad-woven fabrics, and tubular knits). The plants were selected by the developer of the foaming process (United Merchants and Manufacturers, Inc.) to represent a wide range of textile finishing applications.

44104 **(TE—4228-97-79) Chlorine-extraction processes for energy-conserving recovery of nonferrous metals.** Morgan, D.T.; Schad, J.; Zakak, A.; Kim, D.S. (Thermo Electron Corp., Waltham, MA (USA)). Dec 1978. Contract AC02-77CS40057. 182p. NTIS, PC A09/MF A01. Order Number DE81029286.

Portions are illegible in microfiche products.

The application of chlorine extractive metallurgy was evaluated for three applications: recovery of pure copper from chalcopyrite ore, recovery of pure chromium from chromite ore, and recycling of contaminated scrap metals. Main emphasis was given to chalcopyrite processing, and a unique process with many attractive features was proposed. Relative to energy conservation, the new process has the potential for a reduction factor of 5 to 10 in the energy consumption for recovery of copper metal from chalcopyrite. Some experimental chalcopyrite chlorinations of a scoping nature were also carried out. For chromium production, chlorination offers the potential of a reduction factor of 2 in energy consumption, as well as production of very low carbon, pure chrome that may have useful metallurgical advantages. Chlorination is particularly suited for the recycling of metals from low-grade contaminated scrap containing many different metals. Energy savings by scrap recycling is indirect; it reduces the amount of new metal that must be produced by mining, concentration, and smelting.

44105 **PTFE/aramid packing in boiler feedwater pump saves over $2000/year.** McNeeley, S.H. (Savannah River Plant, DuPont Co., Aiken, SC). *Chemical Processing (Chicago);* **46**: No. 1, 132(Jan 1983).

This article describes a polytetrafluoroethylene/aramid packing for boiler feedwater pumps which has saved DuPont Company's Savannah River Plant over $2000/yr. Although the packing is more expensive than the material previously used, the one year minimal service life, compared to less than 8 weeks for the packing previously used, has already saved more than $2000, and the packing is still in service. The yellow packing is made of a chemical resistant aromatic polyamide (aramid) fiber that has high tensile strength and good thermal stability. A low friction coating of chemically inert Teflon PTFE and a non-silicone, temperature stable lubricating oil, are applied to the individual fibers by a patented process before they are interbraided. The dimensionally stable packing can be used with fluids and slurries over a 1-13 pH range and at temperatures from -360 to 570°F.

44106 **(OA-tr—1863) IV 5: all-electric drying of textile cloths.** Donze, J.J.; Viallier, P. (Comite Francais d'Electrothermice, Paris). Sep 1982. Translation of Versailles Symposium, Paper IV 5, April 21-22, 1977, 11 pages. (CONF-7704133—1). 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83001770.

From Comite Francais d'Electrothermie symposium; Versailles, France (21 Apr 1977).

Different methods of mechanical predrying are described and the energy consumption in existing drying machines is shown. An account is given of the comparative performance of the various types of electromagnetic radiation applied to the drying of textiles. Finally a comparison is made of the energy balances of existing hot-air drying and all-electric drying.

3206 Municipalities And Community Systems

REFER ALSO TO CITATION(S) 43488, 43541

44107 (CONF-800972—, pp 5.17-5.20) **Marin Solar Village.** 1980. NTIS, PC A16/MF A01.

From 1980 Department of Energy passive and hybrid solar energy program update meeting; Washington, DC, USA (21 Sep 1980).

Marin Solar Village is a mixed use plan to transform the 1271 acre abandoned Hamilton Air Force Base into a model of energy conserving strategies and integrated systems on a community scale. The design matches low-cost, energy efficient housing with employment, services, and recreation in a coherent, sustainable pattern focussed on the pedestrian. The design strategies which cumulatively achieve a 45% reduction in non-renewable energy use include: climate-responsive solar buildings, energy conserving transportation, and a sustainable community infrastructure. Economic diversity exists through a variety of housing prices, jobs from a mix of large and small businesses, and keeping more earned income within the area both through job creation and less money exported for energy. The feasibility of the energy and resource plan and the social coherence and housing plans of the community are discussed. (LEW)

44108 **(DOE/BP—143) Evaluation of potential for electrical generation using solid waste as fuel in the Pacific Northwest.** (Gershman, Brickner and Bratton, Inc., Washington, DC (USA); USDOE Bonneville Power Administration, Portland, OR). Jun 1983. Contract AC03-76SF00098. 340p. NTIS, PC A15/MF A01. Order Number DE83014183.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The availability of municipal solid wastes (MSW) and nonhazardous industrial solid waste as a fuel for energy production on a county-wide basis is forecasted. In addition, the technical, economic and environmental aspects of energy recovery are analyzed in this report. In order to evaluate the plant siting issues of waste-to-energy systems, three specific projects that propose to use the technologies of interest were examined.

44109 **(DOE/CS/24416—T1) Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I.** (New England Innovation Group, Providence, RI (USA)). 1982. Contract FG01-80CS24416. 182p. NTIS, PC A09/MF A01. Order Number DE83013984.

Portions are illegible in microfiche products.

This report provides a summary introduction and overview of a wide range of activities the City has undertaken. It describes the New England Innovation Group's approach to this technical-assistance effort and traces the origins of the activities described. The Lawrence experience is also compared to another major Department of Energy-funded research effort entitled the Comprehensive Community Energy Management Program (CCEMP). Since the primary objective of this program was to determine how energy and economic development might be better integrated at the municipal level, this report also includes a section on how energy initiatives in Lawrence might influence economic conditions. This discussion defines numerous criteria for assessing the role energy can play in economic development in communities such as Lawrence.

44110 **(DOE/CS/24416—T2) Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II.** (New England Innovation Group, Providence, RI (USA)). 1982. Contract FG01-80CS24416. 119p. NTIS, PC A06/MF A01. Order Number DE83014269.

Portions are illegible in microfiche products.

This report analyzes the resource recovery project, specifically the project's probability of success by examining how it satisfies the crucial criteria for a feasible resource-recovery system. The second section analyzes the costs the City incurred and the benefits it anticipates from participating in the resource-recovery project. In summary, the project has potential for success. Benefits will probably more than adequately compensate the City's efforts. The benefits include a share of the project's revenues, a cost-effective solution to the City's solid waste problem, improved air quality, and simulated economic development. Other municipalities can replicate many of the crucial aspects of the Lawrence program, adapting them as appropriate to satisfy their particular needs and plans.

44111 **(NP—3770002) Nordwestdeutsche Kraftwerke A.G.: 80. business report.** (Nordwestdeutsche Kraftwerke A.G., Hamburg (Germany, F.R.)). Apr 1980. 50p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83770002.

Portions are illegible in microfiche products.

A description of the structure and the activities of this large public utility company is given which had also served as an information basis for the general meeting held on 29th April 1980 in Hamburg. After the report of the supervisory board explanations on the annual balance of 1978/79 are given in the report of the chairman. The balance until 30th September 1979 as well as the loss and profit account are presented in the appendix.

44112 **(NP—3770003) Nordwestdeutsche Kraftwerke A.G.: 81. business report.** (Nordwestdeutsche Kraftwerke A.G., Hamburg (Germany, F.R.)). May 1981. 48p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770003.

Portions are illegible in microfiche products.

A description of the structure and the activities of this large public utility company is given which had also served as an information basis for the general meeting held on 18th May 1981 in Hamburg. After the report of the supervisory board explanations on the annual balance of 1979/80 are given in the report of the chairman. The balance until 30th September 1980 as well as the loss and profit account for the period 1st October 1979 - 30th September 1980 are presented in the appendix.

3209 Education And Public Relations

REFER ALSO TO CITATION(S) 44026

44113 **(DOE/R5/10299—T2) Homemaker energy management. Final report.** Bailey, J.J. (Hammond, City of, IN (USA). Planning and Development Dept.). Jun 1983. Contract FG02-81R510299. 4p. NTIS, PC A02/MF A01. Order Number DE83014673.

Portions are illegible in microfiche products.

A film Homemaker Energy Management is described and production costs are listed. Techniques for energy conservation are shown, not only in daily home management, but also in decoration, interior design, and purchasing (appliances, clothing, etc.). (MHR)

44114 **(DOE/R5/10299—T3) Residential energy survey film. Final report.** Bailey, J.J. (Hammond, City of, IN (USA). Planning and Development Dept.). 12 Nov 1982. Contract FG02-81R510299. 4p. NTIS, PC A02/MF A01. Order Number DE83014857.

Portions are illegible in microfiche products.

A film How to do your own Energy Survey is discussed and production costs are listed. (MHR)

44115 **(ESC—5) Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households.** Midden, C.J.H. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Nov 1980. 262p. (In Dutch). NTIS (US Sales Only), PC A12/MF A01. Order Number DE83770219.

Microfiche only, copy does not permit paper copy reproduction.

The Energy Study Centre, of the Dutch Energy Research Foundation and the Department of Social and Organisational Psychology, Leyden University have performed a researchproject on the effectiveness of behavior change-strategies to influence the energy use in households. An overview is presented of the different

approaches to behavior change: information, the approach based on learning principles and the coercive-approach. A field experiment has been carried out in which the effects of four strategies were tested. These strategies were: 1. general information about how to conserve energy in the home, 2. weekly feedback with respect to the magnitude and financial consequences of the own energy-use, 3. weekly feedback with respect to the magnitude and financial consequences of the own energy-use compared with the use of people in comparable conditions (same houses), 4. weekly feedback (comparative) and financial incentives for reduction of energy-use. The results indicate that the individual feedback and financial incentives + feedback are effective in reducing energy-use, the comparative feedback is effective under certain conditions, the general information seems hardly effective. The results are also related to the attitudes of the residents towards energy conservation.

44116 **(ESC—5SAM) Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households. Summary.** Midden, C.J.H. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Mar 1981. 49p. (In Dutch). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770220.

Portions are illegible in microfiche products.

The Energy Study Centre of the Netherlands Energy Research Foundation ECN and the Department of Social and Organizational Psychology, Leyden University, have jointly undertaken a research project on the effectiveness of behavior change strategies to influence the energy use in family households. An overview is presented of the three different approaches to behavior change: information, the approach based on learning principles, and the coercive-approach. A field experiment has been carried out in which the effects of four strategies were tested. These strategies were: 1. general information about how to conserve energy in the home, 2. weekly feedback with respect to the magnitude and financial consequences of the own energy use, 3. weekly feedback with respect to the magnitude and financial consequenses of the own energy use compared with the use of people in comparable conditions (same houses), 4. weekly feedback (comparative) and financial incentives for reduction of energy use. The results indicate that the individual feedback and financial incentives and feedback are effective in reducing energy use, that the comparative feedback is effective under certain conditions and that the general information seems hardly effective. The results have also been related to the attitudes of the residents towards energy conservation.

44117 **(ESC—20) Energy conservation in households: attitudes, requirements and behavior, a national investigation.** Ritsema, B.S.M.; Midden, C.J.H.; van Heijden, P.G.M. (Stichting Energieonderzoek Centrum Nederland (ECN), Energie Studie Centrum (ESC), Petten, Netherlands.). (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). May 1982. 155p. (In Dutch). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770231.

Portions are illegible in microfiche products.

The results indicate that attitudes towards energy-conservation are relatively more determined by motivational influences than by normative influences, but the differences are small. Differences between various groups have been studied, such as differences between men and women, young and old, high and low socio-economic status (SES), reading habits and political conviction. It has been found that people low in SES are more sensitive to the perceived disadvantages of energy-conserving behavior and that they are more inclined to attribute the causes of the energy-problem to political circumstances than people high in SES. The latter have been found to seek more information about energy conservation. People in their middle age are more positive in their beliefs, attitudes and intentions than younger people (who are more indifferent) than older people (who fear to lose comfort in their homes). Women have slightly more positive attitudes and intentions than men, while men have slightly stronger norms with regard to energy-conservation. Insulated houses have been found more in the country than in large towns, more with home-owners than with home-tenants, and more with high-SES-people than with low-SES-people. Significant differences in energy related behaviors have not been found between groups.

44118 **(ESC-WR—82-04) The social network approach to increase energy conservation: theoretical backgrounds.** Midden, C.J.H. (Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten). Feb 1982. 29p. (In Dutch). Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands.

There are many ways to increase the energy conservation (information, governmental regulations and the behavior treatment), which all try to change the habits of the individual consumer. This report describes a strategy which does not try to approach the individual consumer only but mainly the consumer in his social environment. This approach is sometimes called the social network approach. This report treats some of its features.

44119 **(OTA-CIT—187) Informational technology and its impact on American education.** (Office of Technology Assessment (U.S. Congress), Washington, DC). Nov 1982. 275p. GPO.

This report documents two basic sets of conclusions: (1) the so-called information revolution, driven by rapid advances in communication and computer technology, is profoundly affecting American education. It is changing the nature of what needs to be learned, who needs to learn it, who will provide it, and how it will be provided and paid for. (2) Information technology can potentially improve and enrich the educational services that traditional educational institutions provide, distribute education and training into new environments such as the home and office, reach new clients such as handicapped or homebound persons, and teach job-related skills in the use of technology. An overview of the issues relating to the educational applications of the new information technologies is provided. It examines both the demands that the information revolution will make on education and the opportunities afforded by the new information technologies to meet those demands. Rather than focusing on a single technology, it examines a wide variety of new information products and services such as those based on the combined capabilities of computers, telecommunications systems, and video technologies. Similarly, the report surveys a broad range of educational providers, and examines how the application of information technologies may affect their abilities to provide education and their respective educational roles.

33 ADVANCED AUTOMOTIVE PROPULSION SYSTEMS

3301 Internal Combustion Engines

REFER ALSO TO CITATION(S) 43174, 43175, 43177, 44465, 44466, 44467

44120 **(BMFT-FB-HA—82-046) Objective acoustic quality inspection of complex machines.** Meier, H.E.; Frey, D. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Nov 1982. 84p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751155.

Portions are illegible in microfiche products; With 12 refs., 5 tabs., 29 figs.

Acoustic quality inspection aims to recognize damaged components and manufacturing defects by means of their characteristic noise and vibration. Today inspectors give their assessment; thus they are heavily burdened by noise. In the case of complex machines an automation of this inspection is not yet possible, but partial automation can reduce the effect of noise on the inspectors and at the same time increase the certainty of inspection. The part remaining to the inspector may be eased by suitable auxiliary means. The possibility of partial automation was exemplarily investigated for a combustion engine. Vibration signals were recorded for typical fault classes. For the classes wrong valve clearance, wrong tension of timing chain and faulty grinding of camshaft characteristic signal properties were found by application of signal analysis methods such as envelope curve analysis, signal averaging and spectral

analysis. The measured data e.g. made possible the recognition of wrong valve clearance in 37 out of 40 cases. For the fault classes mentioned above an automation will probably be possible.

44121 **(EUR—8358-EN) No-coolant diesel engine.** Timoney, S.G. (University Coll., Dublin (Ireland). Dept. of Mechanical Engineering). 1983. 92p. European Community Information Service (ECIS), 2100 M Street NW, Suite 707, Washington, DC 20037.

The project was divided into three parts: (1) survey of ceramic and other materials suitable for application in the piston crown and combustion chamber walls and evaluation of these in regard to availability and suitability; (2) design and manufacture of the experimental engine incorporating the ceramic materials; and (3) testing of the engine and analysis of the test results, with a view to experimental evaluation of the ceramic materials. Part 1 and 2 of the project were completed and in themselves have provided valuable information in relation to future work on no-coolant internal combustion engines. Part 3 yielded disappointing results in so far as the ceramic materials failed under test before any comprehensive results could be obtained.

44122 **(NP—3770140) Influence of air flow inside the combustion space on the exhaust emissions of a direct-injection diesel engine.** Barthelmae, L. (Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Maschinenwesen). 30 Jul 1982. 142p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770140.

Thesis.

Measurements of smoke and NO emissions from a direct-injection diesel engine have shown that they are indeed influenced by inlet port design, even though the swirl numbers for the ports may be identical. The swirl numbers of the three ports used (tangential port, helical port and helical port with masked valve) were measured on a steady-state test rig using a paddle-wheel anemometer and impulse swirl meter. Flow measurements were carried out under motoring conditions with a constant-temperature, hot-wire anemometer. It was possible to find a correlation between flow data and exhaust data as far as the in-cylinder air motion over a certain time interval is concerned.

3302 External Combustion Engines

44123 **(DOE/NASA/3194—1) Stirling engine design manual. Second edition.** Martini, W.R. (Martini Engineering, Richland, WA (USA)). Jan 1983. Contract AI01-77CS51040. 411p. (NASA-CR—168088). NTIS, PC A18/MF A01. Order Number DE83015181.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This manual is intended to serve as an introduction to Stirling cycle heat engines, as a key to the available literature on Stirling engines and to identify non-proprietary Stirling engine design methodologies. Two different fully described Stirling engines are discussed. Engine design methods are categorized as first-order, second-order, and third-order with increased order number indicating increased complexity. FORTRAN programs are listed for both an isothermal second-order design program and an adiabatic second-order design program. Third-order methods are explained and enumerated. In this second edition of the Stirling Engine Design Manual the references have been updated. A revised personal and corporate author index is given and an expanded directory lists over 80 individuals and companies active in Stirling engines.

3303 Electric-powered Systems

REFER ALSO TO CITATION(S) 43739, 43977, 44054

44124 **(DOE/CS/51294—01) Near-term electric test vehicle. Phase II. Final report.** (General Electric Co., Schenectady, NY (USA)). Oct 1980. Contract AC03-76CS51294. 470p. NTIS, PC A20/MF A01. Order Number DE83014921.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The purpose of the research and development reported was to develop two advanced experimental electric cars known as Electric Test Vehicles (ETV's). Specific objectives were established for vehicle performance, safety, cost, and consumer acceptance. The vehicles were also specified to be suitable for production by the mid 1980's. Careful attention was given to the interactions between vehicle body and chassis, electrical drive subsystem, and propulsion battery. Electrical, mechanical and control interfaces were carefully analyzed and controlled to insure compatibility between subsystems. Subsystem and system analysis and design and test and evaluation efforts are described in full, and a brief manufacturing study is presented. (LEW)

44125 **(DOE/CS/51294—01-Annex-A) Near-term electric test vehicle. Phase II. Final report.** (General Electric Co., Schenectady, NY (USA)). Oct 1980. Contract AC03-76CS51294. 50p. NTIS, PC A03/MF A01. Order Number DE83014922.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

All drawings for the Electric Test Vehicle are listed. (LEW)

44126 **(DOE/NASA/51044—30) Comparison of road-load-simulator test results with track tests on electric-vehicle propulsion system.** Dustin, M.O. (National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center). Jun 1983. Contract AI01-77CS51044. 17p. (NASA-TM—83393). NTIS, PC A02/MF A01. Order Number DE83015308.

A special-purpose dynamometer, the road load simulator (RLS), is being used at NASA's Lewis Research Center to test and evaluate electric vehicle propulsion systems developed under DOE's Electric and Hybrid Vehicle Program. To improve correlation between system tests on the RLS and track tests, similar tests were conducted on the same propulsion system on the RLS and on a test track. These tests are compared. Battery current to maintain a constant vehicle speed with a fixed throttle was used for the comparison. Scatter in the data was greater in the track test results. This is attributable to variations in tire rolling resistance and wind effects in the track data. It also appeared that the RLS road load, determined by coastdown tests on the track, was lower than that of the vehicle on the track. These differences may be due to differences in tire temperature.

3305 Flywheel Propulsion

REFER ALSO TO CITATION(S) 44010

3307 Emission Control

REFER ALSO TO CITATION(S) 44013

3308 Alternative Fuels

REFER ALSO TO CITATION(S) 43424, 43430, 43472, 43473

44127 **(DOE/NASA/0287—1) Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends.** Rodriguez, C.F.; Barbee, J.G.; Knutson, W.K.; Cuellar, J.P. Jr. (Southwest Research Inst., San Antonio, TX (USA)). Mar 1983. Contract AI01-81CS50006. 39p. (NASA-CR—168061; SWRI—7080). NTIS, PC A03/MF A01. Order Number DE83015325.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Additives commercially available for use in liquid handling systems were obtained and screened for application to the protection of materials used in automotive fuel systems which would be exposed to the harmful effects of methanol should it be used as a gasoline extender. Six additives were chosen to provide a diversity of applications and chemical types in order to enhance the probability of finding an effective formulation. The screening tests determined the efficacy of the additives as modifiers of methanol's cor-

rosivity toward metals and its weakening of tensile properties of nonmetals. From the screening phase, three additives seemed to protect some of the metals; these were tested in higher concentrations and binary combinations in search of optimal application conditions. Results indicated that two of the additives have protective properties and combining them increases the protection of the metals corroded by methanol-gasoline blends. Half of the metals in the tests were not corroded. Testing at recommended concentrations and then at higher concentrations and in combinations showed that the additives would have no protective or harmful effects on the nonmetals. Two additives emerged as candidates for application to the protection of metals in automotive methanol-gasoline fuel systems. The additives tested in this program were assigned letter codes to protect their proprietary nature.

36 MATERIALS

REFER ALSO TO CITATION(S) 43185

3601 Metals And Alloys

REFER ALSO TO CITATION(S) 43420, 43751, 43752, 43754, 43755, 43780, 43781, 43782, 43783, 43784, 43792, 43801, 43802, 43810, 43855, 43858, 43859, 43860, 43861, 43899, 43923, 45198, 45273

44128 (DOE/ER/01367—146) Selection of slip systems in low-temperaure deformation of niobium. Meshii, M.; Bang, G.W. (Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering). 1983. Contract AC02-76ER01367. 9p. (CONF-830680—1; COO—1367-146). NTIS, PC A02/MF A01. Order Number DE83014986.

From International symposium on the structure and properties of crystal defects; Liblice, Czechoslovakia (13 Jun 1983).

The properties of plastic deformation of bcc metals at low temperatures depend strongly on what type of slips operates predominantly. The slip systems unpredicted from the largest resolved shear-stress rule appear prominently and often control the plastic deformation. Considering the coplanar double slip in addition to the single slip, a new selection rule of slip system is proposed in this paper. The predicted slip systems and the experimental observations are in good agreement. The rule also predicts the orientation dependence of yield stress, which is also found to be in good agreement with the experimental results.

44129 (DOE/ER/03158—108) Atomic-resolution study of homogeneous radiation-induced precipitation in a neutron-irradiated W-10 at. % Re alloy. MSC report No. 5014. Herschitz, R.; Seidman, D.N. (Cornell Univ., Ithaca, NY (USA). Materials Science Center). Jun 1983. Contract AC02-76ER03158. 56p. NTIS, PC A04/MF A01. Order Number DE83015037.

Portions are illegible in microfiche products.

The phenomenon of radiation-induced precipitation has been investigated in a W-10 at. % Re alloy using the atom-probe field-ion microscope. Results show a significant alteration of the microstructure of this alloy as a result of the fast-neutron irradiation. Precipitates with the composition ~ WRe (σ phase) were detected at a density of 10^{16} cm^{-3}. Coherent, semicoherent and possibly incoherent precipitates of the σ phase have been observed. They were not associated with either linear or planar defects, or with any impurity atoms; i.e. a true homogeneous radiation-induced precipitation occurs in this alloy. A physical argument is presented for the nucleation of the σ phase precipitates in the vicinity of displacement cascades produced by primary knock-on atoms. It is suggested that the nucleation of the σ phase is due to the formation of tightly-bound mobil mixed dumbells which react to form an immobile rhenium cluster. The growth of this cluster into a precipitate is most likely driven by the irreversible vacancy: self-interstitial atom (SIA) annihilation reaction, as suggested recently by Cauvin and Martin. A mechanism for the suppression of voids, in this alloy, is presented which is self-consistent with the homogeneous radiation-induced precipitation mechanism.

44130 (DOE/ER/03518—105) Quantitative compositional analysis and field-evaporation behavior of ordered Ni_4Mo on an atomic plane-by-plane basis: an atom-probe field-ion microscope study. MSC report No. 4802. Yamamoto, M.; Seidman, D.N. (Cornell Univ., Ithaca, NY (USA)). Oct 1982. Contract AC02-76ER03158. 34p. NTIS, PC A03/MF A01. Order Number DE83014981.

The (211) fundamental and (101) superlattice planes, of the bct lattice, were analysed chemically on an atomic plane-by-plane basis. It was demonstrated that the composition of each individual plane can be determined as a function of depth without any ambiguity. The overall average Mo concentration was measured to be 17.1 at. % for the (211) fundamental plane. Details of the field evaporation behavior of the (211) fundamental and (101) superlattice planes were studied. The field-evaporation behavior is described in terms of the field-evaporation rate, the order of the field evaporated ions, etc. Each individual atomic plane field evaporated on an atomic plane-by-plane basis for the (211) fundamental plane. While for (101) superlattice plane a group of planes consisting of one plane of Mo atoms and four planes of Ni atoms field-evaporated as a unit. An abnormal increase in the number of Mo atoms was found in the central portion of the (211) fundamental plane. Possible mechanisms for the abnormal field evaporation rate are discussed. It is concluded that the atom probe technique can be used to follow the physics and chemistry of the field-evaporation process and the chemistry of the alloy as a function of position, on a subnanometer scale, throughout the specimen. 13 figures.

44131 (DOE/ER/03518—107) Direct determination of a radiation-damage profile with atomic resolution in ion-irradiated platinum. MSC report No. 5030. Pramanik, D.; Seidman, D.N. (Cornell Univ., Ithaca, NY (USA)). May 1983. Contract AC02-76ER03158. 12p. NTIS, PC A02/MF A01. Order Number DE83014982.

The field-ion microscope (FIM) technique has been employed to determine directly a radiation damage profile, with atomic resolution, in a platinum specimen which had been irradiated at 80°K with 20-keV Kr^+ ions to a fluence of 5×10^{13} cm^{-2}. It is shown that the microscopic spatial-vacancy distribution (radiation-damage profile) is directly related to the elastically-deposited-energy profile. The experimentally constructed radiation-damage profile is compared with a theoretical damage profile - calculated employing the TRIM Monte Carlo code - and excellent agreement is obtained between the two, thus demonstrating that it is possible to go directly from a microscopic spatial distribution of vacancies to a continuous radiation-damage profile.

44132 (DOE/ER/10960—3) Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983. Weertman, J.R. (Northwestern Univ., Evanston, IL (USA)). Jul 1983. Contract AC02-81ER10960. 9p. NTIS, PC A02/MF A01. Order Number DE83015331.

The research effort of this grant has been directed into two areas: a study of the high temperature mechanical behavior of a ferritic stainless steel, Fe9CrlMo modified by the addition of small amounts of V and Nb, and an investigation by small angle neutron scattering of changes in its microstructure produced by service at elevated temperature.

44133 (DOE/ER/70294—T1) Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983. Ardell, A.J. (California Univ., Los Angeles (USA). School of Engineering and Applied Science). Apr 1983. Contract AT03-76ER70294. 54p. NTIS, PC A04/MF A01. Order Number DE83012085.

Research is summarized on: irradiation-induced precipitation (IIP) in Pd-Mo and Pd-W alloys; IIP in Pd-W, Pd-Mo, and Pd-V; irradiation damage in concentrated Pd-Cr alloys; irradiation damage in Pd-Cr, Pd-Mn, and Pd-V; and irradiation effects in metallic glasses. (DLC)

44134 (DOE/IR/10321—T1) Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report. Chill, J.L. (Chillcast, Inc., Marion, OH (USA)). [nd]. Contract FG01-80IR10321. 11p. NTIS, PC A02/MF A01. Order Number DE83014234.

The Chillcast, Inc. process for making bearings and bushings offers considerable potential. The ability to minimize machining and scrap loss, especially for middle- and large-diameter bearings, should help to lower manufacturing costs appreciably. In addition, the substantial improvement of mechanical properties resulting from rolling offers the increased performance over as-cast SAE 660 bronze bearings in terms of better load-carrying ability and wear resistance.

44135 (DOE/NE/37900—2) Study of the effects of austenitizing and tempering heat treatments on the alloy HT-9. Redmon, J.W. (Auburn Univ., AL (USA). Dept. of Mechanical Engineering). 1982. Contract AS05-82NE37900. 38p. NTIS, PC A03/MF A01. Order Number DE83015651.

Portions are illegible in microfiche products.

This paper investigates the potential use of the ferritic alloy Sandvik HT-9 (12 Cr - 1 Mo) as an alternative to stainless steels used in high-neutron-fluence environments. The neutron radiation influences embrittlement where the impact-energy versus test-temperature curve is seen displaced to the right. As a result, commercially effective solutioning and tempering processes are needed to suppress this effect in the pre-irradiated condition. The effects of austenitizing treatments on the impact energy of HT-9 were identified. 18 figures, 6 tables. (DLC)

44136 (EGG-M—09983) Research needs for the use of polymer coatings for corrosion protection. Tompkins, H.G. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 14p. (CONF-830676—1). NTIS, PC A02/MF A01. Order Number DE83015443.

From National Science Foundation workshop on long-range research opportunities for substituting non-metallic materials for vulnerable minerals; Washington, DC, USA (27 Jun 1983).

This paper takes a tutorial approach to the subject. Current polymer applications are considered, and past, present, and future research methods are discussed. Benefits of developing coatings for corrosion protection are described.

44137 (EPRI-NP—3062) Intergranular attack of Alloy 600: high-temperature electrochemical tests. Final report. Pinard-Legry, G.; Plante, G. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Section d'Etude de la Corrosion Aqueuse; Framatome, 92 - Paris La Defense (France)). May 1983. 61p. NTIS, PC A04/MF A01. Order Number DE83902588.

In some steam generators, intergranular attack (IGA) has occurred on Alloy 600 tubes in the tube-tube sheet crevice region. In order to evaluate the physico-chemical parameters which influence this type of corrosion, potentiostatic tests were implemented on Alloy 600 C-rings at 320°C in a 10% caustic media. From metallographic examinations performed after 120 hour duration tests it was observed that IGA is a stress assisted phenomenon and occurs on mill-annealed Alloy 600 near the corrosion potential or in the cathodic range. At higher applied potentials only stress-corrosion cracking was observed in the most-highly-stressed regions. Both carbonate and sulfate have a pronounced deleterious effect on IGA. Silicate has an inhibiting effect while phosphate appears to be moderately deleterious. Thermal treatments at 700°C, with or without chromium depletion, strongly improve the resistance to IGA.

44138 (GKSS—82/E/43) Investigation on the dependence of RPV steel embrittlement on irradiation temperature and neutron exposure. Ahlf, J.; Bellmann, D.; Schmitt, F.J.; Spalthoff, W. (GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)). 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750919.

Three stell heats with copper contents of 0.04, 0.15 and 0.25% respectively have been irradiated at 255°C, 285°C and 310°C to 1.7 x 10^{19} cm^{-2}(E>1MeV). A dependence of the ductile-to-brittle transition temperature shift ΔTT on the irradiation temperature Tsub(B) was found. The slope of the ΔTT vs Tsub(B) curves increases strongly with copper content.

44139 (HEDL-TME—83-17) Computer simulation of displacement cascades in copper. Heinisch, H.L. (Hanford Engineering Development Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76FF02170. 75p. NTIS, PC A04/MF A01. Order Number DE83015306.

More than 500 displacement cascades in copper have been generated with the computer simulation code MARLOWE over an energy range pertinent to both fission and fusion neutron spectra. Three-dimensional graphical depictions of selected cascades, as well as quantitative analysis of cascade shapes and sizes and defect densities, illustrate cascade behavior as a function of energy. With increasing energy, the transition from production of single compact damage regions to widely spaced multiple damage regions is clearly demonstrated.

44140 (INIS-mf—7627) Use of the strength ratio for precracked Charpy specimens for the measuring, of the dynamic toughness of steels. Pereira, L.C.; Darwish, F.A.I. (Pontificia Univ. Catolica do Rio de Janeiro (Brazil)). 1981. 10p. (In Portuguese). (CONF-811273—26). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780918.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The specimen strength ratio (R sub(sb)) determined for precraked Charpy specimens fractured in dynamic bending was correlated with plane strain fracture toughness (K sub(Id)) obtained through valid measurements of the J-integral at the moment of fracture initiation in various microstructures of the AISI 4140 steel. The results indicate a linear relationship between K sub(Id) and R sub(sb) for the microstructures considered in this work. The range of validity of this linear correlation is presented and discussed in terms of the ASTM E399 specimen size criterion.

44141 (INIS-mf—7649) Method for the dimensioning of a cantileva-beam submitted to aleatory effects. Sanchez, M.G.; Szajnbok, M. (Sao Paulo Univ. (Brazil)). 1981. 10p. (In Portuguese). (CONF-811273—27). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780919.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The laboratory study of behavior of materials, related to fatigue, is generally done by applying constant amplitude sine wave excitation. The data can be used for the stochastic approach of the problem. One of the methods is called RCA, which incorporates the Linear Rule or Miner's Cumulative Damage Rule. A summary of the theory and a computer program for the calculations are here presented. A cantilever beam is studied as a numerical example and the results are discussed.

44142 (INIS-SU—135, pp 83-86) Development of pits and cones on ion bombarded copper. Tanovic, L.A.; Carter, G.; Nobes, M.J. (Salford Univ. (UK). Dept. of Electrical Engineering); Whitton, I.L. (Copenhagen Univ. (Denmark). H.C. Oersted Inst.); Williams, J.S. (Aarhus Univ. (Denmark). Inst. of Physics). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The formation of pits and cones on Ar ion bombarded copper has been studied. Carefully polished surfaces of large grained 99.999% pure copper crystals have been bombarded at normal incidence with 40 keV argon ions. The cone formation has been investigated for annealed and non-annealed crystals at room temperature and at 30 K and in the case of monocrystal and polycrystal samples. Although in the most other studies the presence of impurities is as a necessary condition for generation of cones and pits the obtained experimental results show that under certain conditions these features are formed on clean surfaces. It is shown that the dominant parameter in the production of cones on copper is the crystal orientation.

44143 (INIS-SU—135, pp 116-118) **Influence of surface contamination on energy distribution of surface channeled ions.** Varelas, C.; Gunther, K.; Sizmann, R. (Muenchen Univ. (Germany, F.R.)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The energy distribution of 150 keV protons scattered at a (110)- Ni-surface in forward direction along <110> is investigated. In the energy spectrum the slope of the tail at the high loss side becomes flattened if the ion trajectories are perturbed by surface contaminations. The thickness of such a contamination film can be estimated from a multiple scattering theory of Sigmund and Winterbon.

44144 (INIS-SU—135, pp 151-154) **Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy.** Koval', A.G.; Mel'nikov, V.N.; Bobkov, V.V.; Klimovskij, Yu.A. (Khar'kovskij Gosudarstvennyj Univ. (Ukrainian SSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The physico-chemical state of the surface of a number of nonrefractory polycrystalline metals (Fe, Cu, Al, Ni) and semiconductor monocrystals of the A^3B^5 group (GaAs, GaP, Gasub(x)Alsub(1-x)As) in vacuum and in the medium of rarefied gases was investigated by the method of secondary ion mass spectroscopy. Mass-spectra of positive and negative secondary ions have been obtained. Determined were I(T), I(P), I(t) dependences, where I - current of certain secondary ions, T - specimen temperature, P - gas pressure, t - time when the current of choosen secondary ions changes on a certain value under the given conditions. It is concluded on the basis of the results obtained that the surface state of the materials under investigation in vacuum (approximately 10^{-7} mm Hg) depends on the metal nature, its temperature, kind and pressure of surrounding gas. Regularities of chemical compound formation on the semiconductor surface are analogous in many respects to regularities for metals, however, there are also considerable differences, in particular, only very thin oxide coatings are formed on the semiconductor surface.

44145 (INIS-SU—135, pp 157-158) **Formation of excited H by impact of H_1^+, H_2^+, H_3^+ ions on metal surfaces.** Rausch, E.O.; Thomas, E.W. (Georgia Inst. of Tech., Atlanta (USA). School of Physics). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

A study has been made of the Hsub(β) line emission from backscattered excited H atoms when polycrystalline Mo and Cu targets were bombarded by 20-200 keV $H_1^+ + H_2^+$ and H_3^+. The paper has extended the previous measurements to higher impact energies and demonstrated that the model adopted for predicting emission coefficient remains valid provided account is taken of the energy dependence of the probability of recoils being excited.

44146 (INIS-SU—135, pp 185-188) **Theory of the secondary electron emission from Al by high energy proton or α-particle bombardment.** Koyama, A. (Institute of Physical and Chemical Research, Wako, Saitama (Japan)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

There are two different phenomena, the potential and the kinetic emission, in the secondary electron emission from solid surface by ion bombardment, according to the incident ion energy. While the potential emission has been explained successfully, the kinetic emission process still contains many unelucidated problems. In the paper the kinetic emission from Al surface by high energy (> 1 MeV) proton or α-particle bombardment has been studied. The contribution from Auger electrons to the kinetic emission has been calculated and compared to that from directly excited electrons.

44147 (INIS-SU—135, pp 241-247) **Study of point defects by channeling measurements of solute atom displacements.** Swanson, M.L.; Howe, L.M.; Matsunami, N. (Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.:. 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Channeling measurements have been used to study the trapping of self-interstitials by solute atoms accompanying with formation of mixed dumbbels in various metals with face-centered cubic and hexagonal close packed crystal structures. The information about defect mobility, trapping radius, trapping configuration, thermal stability and annihilation mechanism has been obtained.

44148 (INIS-SU—135, pp 251-258) **Dechanneling by extended defects.** Campisano, S.U.; Foti, G.; Rimini, E. (Catania Univ. (Italy). Ist. di Struttura della Materia); Picraux, S.T. (Sandia National Labs., Albuquerque, NM (USA)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Channeling effect technique has been applied to investigate dechanneling by dislocations in Al-implanted crystals and by stacking faults in heteroepitaxially grown silicon layers. For these defects direct backscattering has been found negligible with respect to dechanneling. Analysis of ion backscattering data for several analyzing beam energies shows that dislocation dechanneling increases with the square root of the beam energy. Stacking-fault defects are characterized by an energy independent dechanneling cross-section. Comparison with transmission electron microscopy allows the quantitative determination of the cross-sections which compare well with existing calculated values. Large densities of dislocations and stacking faults are necessary for channeling analysis.

44149 (INIS-SU—135, pp 282-284) **Vacancy annealing stage in heavy ion implanted bcc metals.** Reinstema, S.R.; Odeurs, J.; Verbiest, E.; Pattyn, H.; Coussement, R. (Leuven Univ. (Belgium). Inst. voor Kern- en Stralingsfysika). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Lattice damage induced by implantation of radioactive ^{133}Xe in the bcc metals Mo, W and Ta has been studied by the Moessbauer spectroscopy on the 81 keV transition in its daughter nucleus ^{133}Cs. Polycrystalline foils of Mo, W and Ta have been implanted with 70 keV ^{133}Xe at the total implanted dose $4x10^{13}$ atom/cm^2. Moessbauer spectra have been recorded at 4.5 K after the room temperature implantation and after each step in an isochronous (1 hour) annealing sequence to a highest temperature between 1000 and 1100 deg C.

44150 (INIS-SU—135, pp 291-294) **Radiation blistering of Nb implanted with helium ions of energies expected in the fusion reactor.** Gusev, V.M.; Guseva, M.I.; Krasulin, Yu.L.; Martynenko, Yu.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii:; Das, S.K.; Kaminskij, M. (Argonne National Lab., IL (USA)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Results of experiments on the simulation of the effect on a polycrystalline niobium target with He^+ ion spectrum expected in a thermonuclear reactor are given. The niobium targets were successively irradiated with 0.5 V-3500 keV He^+ ions, ion flux density constituted 20-30 μA/cm^2. The irradiated target surface was investigated using a scanning electron microscope. The results obtained testify that the efficiency of blister formation under the conditions considered is determined with low energy ions. Blistering is considerably weaker for He^+ ion energy spectra close to the expected in the thermonuclear reactor than for monoenergetic irradiation.

44151 (INIS-SU—135, pp 294-305) **Surface effects in fusion device operation.** Kaminsky, M. (Argonne National Lab., IL (USA)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Portions are illegible in microfiche products01 refs.; 5 figs.

A review of the types of plasma radiations and their effects on certain components in fusion devices is given. The processes contributing to plasma-contaminant release and to surface damage and erosion are considered. Potential solutions to reduce such processes are discussed.

44152 (INIS-SU—135, pp 306-316) **Which atomic processes dominate plasma wall interaction.** Behrisch, R.; Scherzer, B.M.U. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

A review on the processes in plasma-wall interaction is presented. The following three aspects of the problem are discussed: particle and energy balance, introduction of impurities into plasma, damage at the first wall. Literature data are given on hydrogen and helium ions interaction with tungsten, tantalum, stainless steel and graphite.

44153 (INIS-SU—135, pp 316-318) **Capture of H^+ and D_2^+ ions by stainless steel.** Tel'kovskij, V.G.; Pisarev, A.A.; Ukolov, S.I. (Moskovskij Inzhenerno-Fizicheskij Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Experiments on 15 keV He^+ and D_2^+ ion implantation into stainless steel are described. The irradiation was performed by a mass-monochromator at 2-4x10^{14} part./cm^{2}xs ion current at temperature range of 20-1200 deg C. Temperature dependence of gas release captured during the ion bombardment was recorded. Measurements of gas release spectra permitted to calculate ion capture parameters. It is discovered that the capture parameters slightly depend on solubility and diffusivity of intact material and are determined with radiation defects.

44154 (INIS-SU—135, pp 318-320) **Influence of postirradiation annealing on the evolution of stainless steel surface structure bombarded with helium ions.** Bondarenko, G.G.; Vasilevskij, V.V.; Ivanov, L.I.; Makhlin, N.A.; Shmykov, A.A. (Moskovskij Inst. Ehlektronnogo Mashinostroeniya (USSR); AN SSSR, Moscow. Inst. Metallurgii). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Effect of postirradiation annealing on the surface state of EhP-838 austenitic stainless steel irradiated at 250 deg C with 175 keV helium ions at a total dose of 1.66x10^{18} ion/cm^2 has been investigated. Observation of surface during postirradiation annealing was performed on an emission electron microscope. The occurrence of blistering on the target surface under the given irradiation conditions has been established. During the postirradiation heating the smoothing of blister domes, increase in blister diameters with temperature growth occur and at 1200 deg C practically complete peeling of scales takes place. Part of thermal vacancies in change of the surface structure is discussed.

44155 (INIS-SU—135, pp 323-326) **Some peculiarities of blister formation in metals under hydrogen ion bombardment.** Katrich, N.P.; Budnikov, A.T. (Vsesoyuznyj Nauchno-Issledovatel'skij Inst. Monokristallov, Stsintilyatsionnykh Materialov i Osobo Chistykh Veshestv, Kharkov (Ukrainian SSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

New data on blistering on irradiation of mono- and polycrystals of titanium, tantalum, tungsten, palladium, stainless steel and others with hydrogen ions are given. Blister appearance is established at irradiation doses above 10^{18} cm^{-2}, at that blister size and density depend on the crystal structure and orientation. It is discovered that with the target temperature growth from 78 to 500 K at the same irradiation doses the blister sizes on the tungsten monocrystals decrease while they increase on the polycrystals. It is noted that blistering does not form during the bombardment of metals having exothermic solubility of hydrogen in the temperature range of 300-500 K. Temperature range of blistering appearance is wider on metals having endothermic solubility of hydrogen.

44156 (INIS-SU—142, pp vp) **Void lattice effect on the optical properties of metals.** Sugakov, V.I. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij:. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Optical properties of metals containing void lattice are theoretically investigated. Bands of localized plasmons appear in the system due to overlapping of plasma oscillation fields localized on different voids. The presence of these bands results in peculiarities in the optical spectra of the metal with void lattice: refraction and absorption indices sharply change at the frequencies close to the excitation frequency of pasmons localized on the voids and the reflection coefficient has a gap. The depth of the gap depends on the relative void volume. Numerical calculations are conducted for aluminium crystal containing the void lattice.

44157 (INIS-SU—142, pp vp) **Damaging channeling.** Gann, V.V.; Rozhkov, V.V. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

It is shown that channeling of ions injected into the crystal at the angles to the channeling angle is followed by formation of radiation damages. The rate of defect formation and the thickness of the damaged layer essentially depend on the injection conditions and vary in wide ranges that makes it possible to use the discovered effect for controlled formation of damage profiles.

44158 (INIS-SU—142, pp vp) **Effect of helium on defect structure formation in molybdenum under alpha-particle irradiation.** Ibragimov, Sh.Sh.; Reutov, V.F.; Zhdan, G.T. (AN Kazakhskoj SSR, Alma-Ata. Inst. Yadernoj Fiziki:. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The method of luminescent electron microscopy has been used to investigate the effect of helium on formation of accumulation of radiation defects in the polycrystalline molybdenum both in the alloying process and for the case of preliminary introduction of helium under irradiation by chemical bond-particles with 50 MeV initial energy at high temperatures (500 and 700 deg C). It is shown that helium promotes essential increase of the ratio of defects preserved in the form of dislocation loops and pores. It is concluded that helium forms stable complexes with vacancies and thus decreases the degree of mutual recombination of the Frenkel pores.

44159 (INIS-SU—142, pp vp) **Device for studying dimensional changes of reactor materials during irradiation in accelerators.** Klimenko, S.P. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The design operation of the facility for investigation of the processes associated with changes of materials (growth, creep, etc.) under irradiation of samples by high-energy particles, for example, electrons are described. An inductive transducer performed in the form of a linear differential converter is joined with deformation magnifier in the facility, that permits to execute long-term measurements of deformation with 2x10^{-6} cm sensitivity. The range of working temperatures of sample heating is from 20 to 300 deg C. The data of the conducted investigation of zirconium radiation

growth under electron radiation testify to good serviceability of the facility.

44160 (INIS-SU—142, pp vp) **Specific features of dislocation loop formation under a pulsed high-current beam irradiation.** Golubev, N.A.; Koptelov, Eh.A. (Joint Inst. for Nuclear Research, Dubna (USSR)). 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Formation of interstitial dislocation loops under pulsed radiation mode with tau=10^{-4} s pulse duration and T=10^{-2} s repetition period is theoretically investigated. The results of numerical and analytical solutions of non-stationary equations for the kinetics of radiation defects in nickel at the 373 K temperature are presented. Pulse duration is comparable with time of pulse production. In the result the total dislocation length and loop density formed under pulsed radiation is higher than under continuous radiation equivalent by average rate of defect generation.

44161 (INIS-SU—147, pp vp) **Helium effect on the dislocation network structure in a high-nickel alloy.** Fabritsiev, S.A.; Yaroshevich, V.D. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Helium effect on the dislocation structure in steel-Kh2ON45M4B subjected to annealing for 30 min. at 850 deg C and about 1000 deg C was studied by transmission electron microscopy. At the concentration of 1 appm He the dislocation structure is stabilized, while in annealing of samples containing 30 appm He for 30 min. at 85O deg C helium bubbles appear. In a hexagonal dislocation network helium bubbles are practically of the same size (50 A + 10 A) and found only in the dislocation network and only at its junctions; this can be explained by transformation of the nickel f. c. c. lattice into the h. c. p. lattice on nickel saturation with helium.

44162 (INIS-SU—147, pp vp) **Study of radiation damage in nuclear- and thermonuclear materials using accelerators.** Zhelenskij, V.F.; Neklyudov, I.M. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The paper presents a review of simulation studies of certain radiation effects in reactor core materials using particle accelerators. The theoretical basis of simulation of neutron-induced damages in reactor structural materials by means of ion bombardment, experimental and methodological possibilities, and some of the obtained results are presented. It is shown that satisfying the principal similarity conditions in irradiations with different energetic particles and taking into account correlation equations, from simulation experiments one can derive representative information, predict the behaviour of core materials in nuclear- and thermonuclear reactors, make a preliminary choice of suitable materials and methods of treatment. However, as the problem of radiation damage simulation is rather complicated, further experimental work is required as well as creation of new irradiation technique and development of new methods.

44163 (INIS-SU—147, pp vp) **Radiation hardening and creep of metals.** Ibragimov, Sh.Sh. (AN Kazakhskoj SSR, Alma-Ata. Inst. Yadernoj Fiziki:. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Basic experimental and theoretical data on radiation hardening and creep of metals and alloys under irradiation are considered. The effect of irradiation parameters on the observed phenomena is analyzed. Principal theoretical assumptions on the nature of radiation hardening and creep are presented.

44164 (INIS-SU—147, pp vp) **Positron interaction with radiation defects in W-Re alloys.** Dekhtyar, I.Ya.; Rustamov, Sh.A.; Fedchenko, P.G.; Dekhtyar, M.I. (AN Ukrainskoj SSR, Kiev. Inst. Metallofiziki:. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Angular distributions of annihilation photons from hard 50 MeV gamma radiation in tugsten single crystal alloys doped with rhenium are investigated in the paper. Samples of W-Re alloys were prepared by electron-beam crucibleless zone melting and subsequently heat treated at 1650 deg C under vacuum conditions (10^{-7} torr). The samples were exposed to betatron hard 50 MeV gamma irradiation to integrated doses of approximately 3x10^{6} Roe. For the annealed and the irradiated samples spectral distribution curves were approximated by one parabola and one Gaussian curve. The annealed samples practically have no parabolic component found for the annealed samples. This is due to radiation-induced vacancies forming a complex with impurity Re atoms. Comparison of results obtained for rhenium-doped alloys (1.5, 3.5, 4.5% Re) allows one to conclude that the W-3.5%Re alloy is more stable as compared with the other alloys.

44165 (INIS-SU—147, pp vp) **Effect of high-energy chemical bond-particle irradiation on electron-positron annihilation in deformed titanium alloys.** Dekhtyar, I.Ya.; Ibragimov, Sh.Sh.; Kupchishin, A.I.; Kozin, A.I.; Mukashev, K.M.; Fedchenko, R.G.; Chursin, G.P. (AN Ukrainskoj SSR, Kiev. Inst. Metallofiziki:. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The effect of high-energy chemical bond-particles (40-50 Mev, dose 5x= . 10^{15} cm^{-2}) on the defect parameters in deformed titanium-aluminium alloys is studied by electron-positron annihilation. The deformation in the alloys is shown to result in essential redistribution of electron density in the defects. Irradiations of deformed samples do not lead to changes in the Fermi-momentum for the defects, i. e. the average electron density in defects practically remains unchanged. Correlation between a relative change of the annihtlation parameters and that of parameters characterizing lattice instability allows one to conclude that the lattice instability indicative of the alloy capability of polymorphic transformation induced by deformation is an evidence of a similar capability in the case of radiation damages.

44166 (INIS-SU—147, pp vp) **Effect of difference in impurity and matrix atom scattering cross-section on dislocation pinning under neutron irradiation.** Krishtal, M.A.; Vybojshchik, M.A.; Rusanov, E.A. (Tol'yattinskij Politekhnicheskij Inst. (USSR)). 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

From a number of previous experiments the authors conclude that the rate of internal friction changing (dQ^{-1}/dtau) and the total change in internal friction up saturation (K) of copper alloys containing different concentrations of impurities (0.001 to 0.1%) under continuous neutron irradiation to 10^{14} neutrons/cm^{2} do not depend on impurity-dislocation interaction energy determining dislocation pinning by interstitials. The inconsistency was explained on the assumption that with similar concentrations of one of the principal factors in neutron irradiation, it is not the dislocation pinning by interstitials, but the difference in cross-sections of neutron scattering by matrix atoms and impurities. The calculations performed allow the difference in scattering cross-sections to be taken into account. Using the calculations dQ^{-1}/dtau and K are plotted as functions of the parameter characterizing the difference in cross-sections; the plots show good agreement between the measured values and the parameter.

44167 (INIS-SU—147, pp vp) **Mechanisms of amplitude- and time dependence of internal friction due to radiation defects.** Krishtal, M.A.; Vybojshchik, M.A.; Rusanov, E.A. (Tol'yattinskij Politekhnicheskij Inst. (USSR)). 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The amplitude- and time dependences of internal friction in copper-base alloys under neutron irradiation is studied in detail.

The nature of amplitude dependence variation is shown to depend on the degree of initial pinning of dislocations by interstitials. For the alloys containing interstitials with low values of "impurity-dislocation" bond energy neutron irradiations result in additional pinning of dislocations. However, for the alloys with interstitial having high "impurity-dislocation" bond energies irradiation leads to unpinning of dislocations and decrease in the critical amplitude of dislocation breaking away from the pinning points. It is concluded from the experiments performed that radiation defects interact not only with elastic dislocation field, but also with the other fields of interstitials. The interaction between the radiation defects and impurities on the dislocations may result in dislocation pinning and unpinning. The time dependence of internal friction after neutron irradiation is investigated in considerable detail. The internal friction is presented as a function of fluence (with the excitation signal switched off) and the excitation signal amplitude. The internal friction variation on switching the excitation signal on and off is ascribed to radiation defect migration in the dislocation region. The variation in internal friction on switching the excitation signal on is shown not to be followed by variation in elastic modulus.

44168 (KFK—3325, pp 72-80) **Simulation irradiation of binary copper alloys.** Leister, K.H. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

The measuring technique and some results are reported.

44169 (KFK—3325, pp 81-92) **Swelling behavior of ferrites and austenites exposed to heavy ions.** Exel, K. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

The influence of the lattice type on the swelling characteristics of ferrites and austenites is illustrated by the two model materials of iron and nickel. The basic mechanisms are not fully explored yet. The influence of carbon on swelling cannot be studied by carbon irradiation; instead, carbon implantation must proceede irradiation. Grain size effects in iron and nickel must be investigated. The findings must be validated by means of heavy-ion irradiation of commercial alloys.

44170 (KFK—3325, pp 93-102) **Simulation irradiation of segregation-hardening Al and Ni alloys.** Schmelz, K. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

An account is given of the stability of segregations resulting from the irradiation of an Al-Mg-Si alloy. The results lead to the establishment of a new model allowing description in quantitative terms.

44171 (KFK—3325, pp 103-109) **Representation of the simulation irradiation project.** Ehrlich, K. Jun 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

In Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project.

The future developments of simulation irradiations are outlined.

44172 (LA-UR—83-1724) **Evidence for stacking faults in multiaxial strained alpha-brass.** Roof, R.B. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 9p. (CONF-830887—1). NTIS, PC A02/MF A01. Order Number DE83014118.

From Joint meeting of American Crystallographic Association and Denver X-ray conference; Snowmass, CO, USA (1 Aug 1983).

Two different techniques of x-ray diffraction have been applied to the examination of multiaxial strained alpha-brass. From an examination of the unfolded Fourier coefficients describing the shape of the diffraction profile it has been determined that the true crystallite size probably exceeds 2000 A, a practical upper limit for determining crystallite size by x-ray methods. The localized strain is approximately 0.225% and a combined stacking fault probability $(1.5\ \alpha' + \beta) = 0.0185 +- 1$. From lattice constant variations the single stacking fault probability, α', has been determined to be $0.0054 +- 22$. The twinning stacking fault, β, is thus $0.0104 +- 22$. The reciprocal of the probability is the number of planes of atoms between the indicated stacking fault. The magnitude of the numbers indicates that twinning is twice as common as single stacking faults.

44173 (NILU-OR—17/81-ES) **Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content.** Henriksen, J.F.; Haagenrud, S.E.; Gram, F. (Norsk Inst. for Luftforskning, Kjeller). 1981. 55p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750792.

Portions are illegible in microfiche products.

The annual corrosion costs and possible corrosion cost reductions are estimated for the event that the maximum sulphur content in fuel oil is reduced to 1% in the Southern part of Norway. As a basis for the calculations the authors have used the same model as employed by the Swedish Corrosion Institute in a study conducted for OECD, with adjustments to the basic data to suit Norwegian conditions. The calculations refer to 1979, and are limited to painted steel and galvanized steel in the form of sheeting, wire and profiles. The period 1960-79 is used as a basis for the accumulation of quantities of material. The total yearly costs of corrosion in the nine countries studied are estimated at 644 million kroner in built-up areas and 345 million kroner in rural areas, totalling 989 million kroner. Corresponding yearly savings given a requirement for a sulphur content of maximum 1.0% are 14.7 million kroner and 1.0 million kroner respectively, totalling 15.7 million kroner. These are relatively rough calculations and are made on the basis of data that are fairly easily accessible. Emphasis has been placed on cautious assessments. Calculations of uncertainties show that the total saving of 15.7 million kroner may lie between 12 and 49 million kroner. 3 drawings, 9 tables.

44174 (NP—3770007) **Influence of hydrogen on pure iron and steel at medium and high pressure levels.** Gosch, R. (Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik). 21 Jan 1981. 94p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770007.

Portions are illegible in microfiche products; thesis.

Under high pressure, hydrogen can penetrate into pure iron and steel without activation. Up to now hydrogen loading could only be observed after activation i.e. by deformation. At high pressures the activity of hydrogen seems to be sufficiently large to overcome the restraints at the surface. An equilibrium is established between the loading pressure and the hydrogen concentration in the material. The hydrogen content is assumed to consist of two components, atomic hydrogen resolved in the lattice, and molecular hydrogen enclosed in traps. According to this assumption the molecular component has the same pressure as the exterior gas phase. Due to the non-ideal behaviour of the hydrogen gas, the relative amount of hydrogen in the gas phase decreases with increasing loading pressure.

44175 (NUREG/CP—0044-Vol.1, pp 193-232) **Crack growth behavior of sensitized stainless steel in high temperature, high purity oxygenated water.** Horn, R.M.; Hale, D.A.; Jewett, C.W.; Lange, C.H.; Kass, J.N. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

Crack growth rates for sensitized Type-304 stainless steel in high temperature, high purity oxygenated water were studied under both cyclic and non-cyclic loading conditions. Fracture mechanics test specimens were utilized to develop the laboratory data in stainless steel with various degrees of sensitization. Cyclic crack growth tests were performed to evaluate the roles of cyclic frequency and degree of sensitization in oxygenated water. Crack growth rates were measured and the conditions resulting in IGSCC were identified. Non-cyclic constant load tests under varying coolant oxygen conditions and varying degrees of sensitization were also performed successfully to develop crack growth rate data. Evaluation of all growth data as a function of coolant oxygen, sensitization level, and

loading mode were made. The significance of these data is discussed in terms of formulating potential in-service inspection plans.

44176 (NUREG/CP—0044-Vol.1, pp 233-262) **Low temperature sensitization of weld heat-affected zones in Type 304 stainless steel.** Caligiuri, R.D. (SRI International, Menlo Park, CA); Eiselstein, L.E.; Fox, M.J. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

The effects of low temperature sensitization (LTS) on the initiation and growth of the intergranular stress corrosion cracks in Type 304 stainless steel weld heat-affected zones (HAZs) were investigated. Constant extension rate test data indicate the LTS heat treatments as low as 400°C can facilitate the initiation of intergranular stress corrosion cracking (IGSCC) in the HAZs in 288°C, 0.2 ppM O_2, high purity water after only a few days at the sensitizing temperature. Extrapolation of these data using an Arrhenius temperature dependence to a 288°C sensitizing temperature predicts that, along with appropriate environmental and stress conditions, IGSCC can initiate in the HAZs in as little as one month. Crack growth experiments on compact tension specimens given the same heat treatments suggest that once initiated, the cracks grow slowly, at a rate ranging from 10^{-8} to 10^{-7} mm/s, depending on the environment. The corresponding threshold stress intensities, K/sub ISCC/, defined as the stress intensity below which growth stops, ranging from 15 to 25 MPa$\sqrt{m}$, also depending on environment. The K/sub ISCC/ are similar, but the growth rates are about an order of magnitude lower than the growth rates reported for Type 304 stainless steel sensitized at temperatures above 600°C.

44177 (NUREG/CP—0044-Vol.1, pp 295-319) **Role of uncertainty in the measurement of crack length by compliance techniques.** Ballinger, R.G. (Massachusetts Inst. of Tech., Cambridge); Latanision, R.M.; Moshier, W.C.; Pelloux, R.M.N. May 1983. NTIS, PC A14/MF A01 - GPO $7.50. (MEA—2014; CONF-8105220—).

From International Atomic Energy Agency specialists' meeting on subcritical crack growth; Freiburg, F.R. Germany (13 May 1981).

An experimental program is underway to investigate the effect of thermal treatment and electrochemical potential on the cyclic crack growth behaviour of Inconel-600 and Inconel X-750 in deoxygenated high purity water at 290°C. As part of the program an investigation has been conducted to determine an approximation for the degrees of uncertainty in the elastic compliance technique used for determining crack length. Preliminary results indicate that for room temperature-air crack growth measurements an uncertainty of approximately 1.5% can be expected for the value of measured compliance. For the specimen geometry used this translates to an uncertainty in the effective crack length of 0.25 mm. In an aqueous environment at 290°C, 10.34 MPa the estimated uncertainty in compliance measurement can be as much as 6.5% which translates to a crack length uncertainty of 1.83 mm. These uncertainty values have a significant impact on the measurement intervals required for statistically meaningful crack growth rate data generation.

44178 (NUREG/CP—0044-Vol.2) **Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.** Cullen, W.H. (ed.). (Materials Engineering Associates, Inc., Lanham, MD (USA)). May 1983. 433p. NTIS, PC A19/MF A01 - GPO $9.00. Order Number DE83902447.

Portions are illegible in microfiche products.

Separate abstracts were prepared for 19 papers in this proceedings. (LEW)

44179 (NUREG/CP—0044-Vol.2, pp 3-26) **Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms.** McMinn, A. (Springfields Nuclear Power Development Labs., England). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Use of fractography in the area of understanding the micromechanisms of failure, especially the inter-relationships betweren environment, stress, microstructure, and fracture surface characteristics is discussed, particularly with regard to the understanding of the mechanisms of corrosion fatigue crack growth for ferritic pressure vessel steels and austenitic stainless steels in light water reactor environments. Some ideas on the mechanisms of corrosion fatigue are presented to explain the fractogrpahic evidence and the crack growth behaviour of steels. The pressure vessel steels were examined in light water reactor environments with varying pH, conductivity and oxygen content. Tests were performed at several combinations of stress ratio and cyclic frequency. (LEW)

44180 (NUREG/CP—0044-Vol.2, pp 27-66) **Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels.** Toerroenen, K. (Technical Research Centre of Finland, Espoo); Haenninen, H.; Cullen, W.H. Jr. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

An analysis of the cyclic crack growth rate data generated so far for pressure vessel materials in simulated light water reactor environments suggest a strong dependence on waveform, frequency, load ratio, temperature and material composition. To account for these observations a mechanistic crack growth model has been advanced based on hydrogen-induced cracking where anodic dissolution creates the conditions for hydrogen absorption at the crack tip. Hydrogen-induced cracking starts from the manganese sulfide inclusions, which act as strong hydrogen traps. The hydrogen-induced crack growth around the sulfides spans generally several prior austenite grains. At high hydrogen input rates brittle crack growth occurs also unconnected to inclusions. When crack growth uncovers manganese sulfide inclusions they dissolve and change the crack tip environment aggressive and condusive to hydrogen absorptionm. This hydrogen-induced cracking model explains why inclusions form a preferred crack path and the effect of sulfur on crack growth rate both in PWR and BWR conditions. Based on the model the observed crack growth rate dependence on different testing variables can be qualitatively explained.

44181 (NUREG/CP—0044-Vol.2, pp 91-126) **Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels.** Scott, P.M.; Truswell, A.E. (Atomic Energy Research Establishment, Harwell, England). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

The results of an experimental programme designed to obtain corrosion fatigue crack growth data for pressure vessel steels are described. The work has concentrated on assessing the influence of various water chemistry variables possible in PWR or BWR primary coolants on fatigue crack propagation rates in A533-B steel. At a low cyclic frequency, 0.0167 Hz, the only variable found to have a significant effect on crack growth rates when compared with an inert helium environment at the same temperature, 288°C, is the dissolved oxygen concentration at levels in excess of 100 ppB. However, the effect of the oxygenated water on crack growth is observed to decay rapidly with time of exposure and this is attributed to passivation of surfaces previously created by high frequency cycling in a short period of time. At higher cyclic frequencies of 1.0 Hz or greater, periods of constant crack growth rate independent of the applied cyclic stress, intensity factor have been observed in all the aqueous environments examined. The reason for this behavior is believed to be the occurrence of a form of strain rate sensitivie stress corrosion cracking superimposed on normal fatigue behaviour. A mechanistic model based on this proposition is developed and is used to explain how the electrochemical conditions within the experimental rigs of different laboratories can influence the range of frequency and stress ratio over which the stress corrosion phenomenon can occur. It is suggested that this mechanism accounts for apparent laboratory to laboratory disagreements from nominally the same corrosion fatigue experiments.

44182 (NUREG/CP—0044-Vol.2, pp 127-142) **Fatigue crack growth of low alloy steels in PWR environment.** Amzallag, C. (Creusot-Loire, Firminy, France); Bernard, J.L. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

The paper presents different features of the fatigue crack growth of low alloys steels, in pressurized hot water environment. The materials studied are a forged steel A 508 Cl 3 and a rolled steel A 533 B1. The parameters investigated were: frequency-sulfur content, waveform, stress ratio R. The results are compared with published data, and suggestions on the mechanisms involved are made.

44183 (NUREG/CP—0044-Vol.2, pp 198-222) **Fatigue crack growth theory based upon energy consideration.** Milella, P.P. (Comitato Nazionale per l'Energia Nucleare, Rome, Italy). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

A theoretical study is made on the fatigue crack growth process to establish what physical parameters significantly intervene in the phenomenon. An enegy approach is used, and factors considered include energy lost in the plastic zone, the shape of the plastic zone after cycling, and energy lost per cycle ahead of the plastic enclave. Maximum fatigue crack growth and subcritical crack growth are discussed. (LEW)

44184 (NUREG/CP—0044-Vol.2, pp 223-247) **Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water.** Gabetta, G.; Fossati, C. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

As a part of a main program in environmental fatigue on pressure vessel steel at 288°C, tests have been performed in demineralized water at 93°C on these materials with the purpose of obtaining crack growth rate data and information on the environmentl mechanisms at two different temperatures. The effect of the oxygen content in water was studied, two oxygen concentrations were chosen: (1) ~ 0.01 ppM (de-oxygenated water); and (2) 5/6 ppM (oxygen saturated water). The obtained results show that an oxide layer forms inside the crack at thè higher oxygen concentration; that oxide layer causes a kind of crack closure, which is responsible of an increase of K/sub MIN/ and R ratio. It is therefore necessary to correct the applied K value with a calculated effective K. Because of the imposed loading wave form (ramp with fast reset), the presence of the oxide can easily be detected by a double slope in the specimen mouth opening vs time. A few thousand cycles are necessary for the information of a detectable oxide layer. The oxide formation is probably related to the deformation rate at the crack tip: at high deformation rates (end of tests, higer frequencies), the oxide effect is less apparent. At higher R ratio (0.7) the oxide stills forms, however its effect is less detectable.

44185 (NUREG/CP—0044-Vol.2, pp 249-294) **Mechanism of environmentally-controlled crack-growth of structural steels in high-temperature water.** Ford, F.P. (General Electric Corp., Schenectady, NY). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

The slip dissolution model isused as a working hypothesis to explain the variations in environmentally-controlled cracking susceptibility of 304 stainless steel and SA333Gr6 carbon-steel in water as a function of oxygen, temperature, and strain rate. It is shown that the model is able to predict quantitatively the observed crack morphology and propagation rate of sensitized 304 stainless steel in H_2O/O_2 mixtures at 100°C, and the blunting kinetics of SA333Gr6 carbon steel in the same environment. The variation in crack-morphology in the spectrum of straining modes covering static sthrough high-frequency loading is also understandable. The model is able to explain qualitatively both the anomolously high cracking susceptibility of various iron-based alloys that is noted around 200°C in water woth low oxygen contents (e.g., ~ ≲ 0.2 ppM O_2), and the relative crack propagation rates of carbon steel and stainless steel in water at 288°C.

44186 (NUREG/CP—0044-Vol.2, pp 303-325) **Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material.** Harada; (Kyushu Inst. of Tech., Tobata Kitakyushu, Japan); Kussmaul; Schwab. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

In order to better understand directionality effect mainly related to MnS inclusions on fatigue crack growth rate, fatigue tests were carried out using CT specimens removed from two differently forged plates 3300 x 1500 x 250 mm and 1500 x 200 x 120 mm with a sulphur content of 0.011%. Specimen orientations were varied as L-S, L-T, T-S, T-L, S-L, and S-T for the first plate and as L-T and T-L for the second plate, where, L, T and S indicate longitudinal, transvere and short transvers direction, respectively. Anisotropy was characterized by metallographic investigations and tensile and impact toughness tests. Low and high cyclic stress amplitudes were selected for the evaluation of stress amplitude dependency at room temperature. Cyclic crack growth rate was measured by microscopic observation on both edges of the crack front. Although both plates showed a strong toughness directionality effect of about 4 : 1 in C/sub v/-impact strength, no effect in fatigue crack growth rate resulted at low ΔK values. Directionality became efficient, only when ΔK was significantly above 800 $N/mm^{-3/2}$ (maximum acceleration factor about 2).

44187 (NUREG/CP—0044-Vol.2, pp 327-342) **Some thoughts on establishing design and inspection codes for corrosion fatigue.** Tomkins, D. (Atomic Energy Research Establishment, England); Scott, P.M. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Corrosion fatigue crack growth initiation and crack propagation is a potential failure mechanism for pressure vessel steels exposed to typical LWR aqueous environments. There are, apparently, a multitude of influencing variables, and only a limited understanding exists of the mechanism and of any limits to the rates of corrosion fatigue crack nucleation and growth. In this paper, we consider how existing ASME codes, which explicitly or implicitly include quantitative procedures for estimating corrosion fatigue lives, may be improved on the basis of our current understanding of mechanisms. The requirements for safe and relatively simple calculation methods are discussed and the demarcation between scientific certainty and engineering judgement highlighted.

44188 (NUREG/CP—0044-Vol.2, pp 343-354) **Use of notched compact tension tests for crack initiation design rules in high-temperature water environments.** Prater, T.A.; Coffin, L.F. (General Electric Co., Schenectady, NY). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

This report describes the techniques used and results obtained for fatigue crack initiation of notched compact tension (CT) tests of SA333 Gr.6 carbon steel in air or autoclaves mostly at 550°F, 1500 psi oxygenated water conditions. The fatigue crack initiation life N/sub i/ was quantitatively determined from a cycle-by-cycle crack length measurement as the number of cycles to produce 0.003 in. of growth from the notch root. Results for several parameters of the experimental program (including temperature, environment, oxygen content, frequency of cycling, notch radius, R-value, and ΔK) are reported. A majority of the tests were run in 550°F water at 8 ppM O_2 with 0.002-in. notch radii, and showed a severe degradation in initiation life especially at low frequencies (0.0125 cpm) in comparison to 550°F air tests. On the other hand, at 1.25

cpm and 8 ppm O_2, decreasing the temperature to 450°F restored the life to that of air. Reducing the oxygen level to 0.2 ppM in 550°F water was also beneficial. These latter two findings are preliminary because of limited testing.

44189 (NUREG/CP—0044-Vol.2, pp 355-370) **Crack growth studies on a carbon steel in oxygenated high-pressure water at elevated temperatures.** Prater, T.A.; Coffin, L.F. (General Electric Co., Schenectady, NY). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Results of an extensive investigation on the stress corrosion and corrosion fatigue crack growth of SA333 Grade 6 carbon steel in 8 ppM oxygen water at 1500 psi and three temperatures are reported. These results provide a background for the crack growth phenomenology of this material/environment interaction as well as serving as a data base for a suggested defect tolerant design approach and for failure analysis.

44190 (NUREG/CP—0044-Vol.2, pp 371-379) **Subcritical fatigue crack growth under combined primary and secondary loads.** Fuhlrott, H.; Schulze, H.D. (RWTUV, Essen, Germany). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

For pipes with flaws which were subjected to load both through primary stresses and secondary stresses it was intended to determine flaw growth over the operating time. Since the effect of the combined primary and secondary stresses on the fatigue crack growth could not be determined on the basis of present knowledge component tests were carried out. The experimental results were then subjected to fracture mechanics analysis. It was found that in a first approximation the secondary stresses should be evaluated in the same way as additional primary stresses in the analysis of fatigue crack growth. Because of the agreement between experimental and analytical results a transfer to other parameters is possible.

44191 (NUREG/CP—0044-Vol.2, pp 381-402) **Crack initiation and crack growth at the inner nozzle corner surface under thermal shock loading.** Jansky, J.; Sauter, A.; Beisswaenger, F. (Univ. of Stuttgart, Germany). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

This paper reported about preliminary experimental work for estimating crack initiation loading cycles on ferritic and austenitic materials and crack growth rates. The maximum crack growth rates under operating conditions and with a high content of oxygen in the pressurized water (700 ppM) is comparable with the ASME-curve water within a ΔK range to 40 $MN.m^{-3/2}$.

44192 (NUREG/CP—0044-Vol.2, pp 403-414) **Thermal fatigue crack growth analysis in a nozzle corner.** Blauel, J.G.; Hodulak, L. (Fraunhofer-Inst. fuer Werkstoffmechanik, Freiburg, Germany). May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V.

Calculations of the crack growth under local thermal shock fatigue are performed. Estimates of crack growth are based on stress distributions obtained by a finite element analysis for thermal transients in the structure without crack. Stress intensity factors are calculated using interpolation formulae derived from known basic solutions for part-through cracks under constant and linearly varying load. The crack propagation at selected parts of the crack front is calculated stepwise by integration of the Paris law with material constants C and n interpolated from test results on compact specimens at constant temperatures. Experimental results for the model vessel test MB1 at an internal pressure of 14 N/mm^2 and a temperature of 320°C exposed to a repeated local spraying with cold water are presented and compared to predictions.

44193 (NUREG/CP—0044-Vol.2, pp 415-428) **Subcritical crack growth in underclad region.** Brumovksy, M.; (Skoda, Plzen, Czechoslovakia); Linhart, V.; Ruda, J. May 1983. NTIS, PC A19/MF A01 - GPO $9.00.

In Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth.

Paper deals with the problem of subcritical crack growth in the transition zone between base material and austenitic stainless steel cladding. As a material under the study steel of Cr-Mo-V type (15KhMFa) has been chosen. Crack growth rate as a function of stress intensity factor has been measured for pure base and clad materials likewise for the transition zone, too. In the latter case, cracks started both from the surface (cladding materials) and from the base material. For base and cladding materials treshold stress intensity factors have been determined as a functin of stress asymmetry. Discussion of these results is made with respect to other literature results, and to the reactor pressure vessel lifetime and safety.

44194 **(PNL-SA—9157) Effects of O_2 addition on the growth of columnar shadowing defects in sputtered Ni.** Patten, J.W.; Moss, R.W. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1981. Contract AC06-76RL01830. 13p. (CONF-810425—7). NTIS, PC A02/MF A01. Order Number DE83014645.

From International conference on metallurgical coatings; San Francisco, CA, USA (6 Apr 1981).

Ni was sputter deposited in a supported discharge Kr plasma with O_2 concentrations up to approximately 80%. The sputtering system is described. Microstructural data are presented to indicate that O_2 addition increased the severity of columnar shadowing defect growth in direct proportion to O_2 concentration and that the Ni-O reaction occurring at the substrate surface dominated film growth for O_2 concentration above approximately 70%. Implications for interpretation of growth structures in terms of temperature and system pressure are discussed. An expanded model describing parameter dependence of defect growth in thick, line-of-sight deposited films is presented.

44195 **(SAND—83-0772C) Intermediate velocity penetration of steel spheres into deep aluminum targets.** Trucano, T.G.; Grady, D.E. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 5p. (CONF-830719—8). NTIS, PC A02/MF A01. Order Number DE83015205.

From Topical conference on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

Portions are illegible in microfiche products.

We report the results of a study focused on identifying the effects and significance of adiabatic shear-band formation in metal-penetration phenomena. We performed experiments in which targets of 6061-T6 aluminum were impacted by hardened steel spheres at velocities varying from 0.6 to 1.2 km/s. The targets were large enough to be treated as infinite half-spaces in subsequent analyses. Depth of penetration and target microstructure were observed after each experiment and compared with the results of quasistatic punch tests performed on identical targets. Shear bands were observed in the targets for the dynamic experiments, but were absent in the quasistatic tests. Analyses performed indicate that thermal softening and/or thermal-shear localization does strongly influence the dynamic penetration process, although not as significantly as previously reported.

44196 **(SAND—83-0801C) Dynamic instability in adiabatic thermoplastic shear.** Burns, T.J. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 3p. (CONF-830719—7). NTIS, PC A02/MF A01. Order Number DE83015206.

From Topical conference on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

The formation of adiabatic shear bands in ductile metals under dynamic loading conditions is generally thought to result from a material instability which is associated with a peak in the curve of engineering plastic flow stress vs engineering shear strain. This instability rises from the effect of thermal softening, caused by irreversible adiabatic heating, which counteracts the tendency of the material to harden with increasing plastic strain. Asymptotic

analysis of a one-dimensional rigid-thermoviscoplastic model, based on data taken from dynamic torsion experiments on thin-walled tubes of mild steel, shows that shear band formation in this situation can be interpreted as a bifurcation from a homogeneous shearing deformation which occurs near the peak in the homogeneous stress-strain curve. It can be shown that the growth rate of small perturbations on the homogeneous deformation is controlled by the ratio of the slope of the homogeneous stress vs strain curve to the material viscosity, i.e., the rate of change of the plastic flow stress with respect to the strain-rate. In addition, it can be shown that this growth rate is essentially independent of the wavelength of the small perturbation. Numerical methods can be used to show that this growth rate beyond the bifurcation point may not be sufficiently large for the model to account for the experimental data.

44197 **(SAND—83-1608C) Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium.** Anderson, J.R.; Schirber, J.E. (Sandia National Labs., Albuquerque, NM (USA); Maryland Univ., College Park (USA). Dept. of Physics and Astronomy). 1983. Contract AC04-76DP00789. 5p. (CONF-830763—2). NTIS, PC A02/MF A01. Order Number DE83014779.

From 9. AIRAPT conference; Albany, NY, USA (25 Jul 1983).

Measurements of the effects of pressure on Fermi surfaces of vanadium, rhenium, and rhodium have been carried out at pressures up to 4 kbar using the solid-helium, phase-shift technique. Comparisons between these results and those from similar elements, niobium, cobalt, and palladium, show that pressure is an important parameter for testing Fermi surface models.

44198 **(SVF—126) Metallographical methods for observation of creep cavities in service exposed low alloyed steel.** Bengtsson, C. (Stiftelsen foer Vaermeteknisk Forskning, Studsvik (Sweden)). Mar 1982. 31p. (IM—1636). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750773.

Three different metallographical preparation methods for the observation of creep cavities have been compared. These methods are mechanical polishing followed by ion milling and chemical etching respectively, and electrolytical polishing. Ion milling is considered as a reference technique. As test specimen a service exposed welded joint of 1Cr0.5Mo was used. The cavities were quite small ($=<0.5\mu m$) and could be identified with difficulty in the light optical microscope (LOM). In addition to the larger depth of field SEM has the advantage that cavities and carbides appear dark respectively bright and can be distinguished without difficulty. For the two other preparation methods chemical and electropolishing, the cavities are enlarged and their number is probably increased compared to ion milling. With all three techniques the appearance of the cavities is more or less identical compared to that observed from the specimen surface. The contrast in SEM is inverted for replicas and cavities and carbides are shown bright and dark respectively. The chemical etching has the advantage compared to electropolishing that the basic bainitic-ferritic microstructure is more clearly shown with the former technique. However, both these techniques are possible to apply and are also applied for the detection of creep damage in e.g. fossil fired power plants. Ion milling is not practical to use in a plant, and in addition the basic microstructure is hardly etched at all and it is e.g. difficult to judge whether cavities are lying along the grain boundaries which is of importance for safe identification of them.

44199 **(UCRL—88635) High-pressure equation of state of Li, Na, and K.** Ross, M.; Young, D.A.; Boehler, R. (Lawrence Livermore National Lab., CA (USA); California Univ., Los Angeles (USA). Inst. of Geophysics and Planetary Physics). 21 Jun 1983. Contract W-7405-ENG-48. 6p. (CONF-830768—1). NTIS, PC A02/MF A01. Order Number DE83014844.

From 9. International Association for the Advancement of High Pressure Science and Technology conference; Albany, NY, USA (25 Jul 1983).

We examined the usefulness of local pseudopotential theory at high pressure by a systematic comparison of experimental Li, Na, and K data with theoretical predictions. For the prupose of this study, new measurements were made for the melting curve to 32 kbar and of delta P/delta T)/sub s/ to 32 kbar and 400°C. We used room temperature isotherms to determine the two parameter Heine-Abarenkov local pseudopotential. Calculations of the melting curves, liquid isotherms, and delta P/delta T)/sub s/ were generally in good agreement with experiment. The major deficiency in the theory appears to stem from the unrealistically soft behavior of the potential at small interatomic separations which lead to negative Grueneisen parameters at high compression. This feature is probably also responsible for some of the disagreements between theoretical and experimental Hugoniots.

44200 **(UCRL—88870) Properties of hot expanded liquid aluminum.** Gathers, G.R.; Ross, M. (Lawrence Livermore National Lab., CA (USA)). 1 Jul 1983. Contract W-7405-ENG-48. 8p. (CONF-830888—1). NTIS, PC A02/MF A01. Order Number DE83015058.

From 5. international conference on liquid and amorphous metals; Los Angeles, CA, USA (15 Aug 1983).

Measurements of temperature, volume, enthalpy, and electrical resistivity have been made on aluminum expanded isobarically by 50% in volume to temperatures of about 4000°K. These measurements are compared with the predictions of liquid-metal pseudopotential theory.

44201 **(UCRL—88901) Hugoniot measurements in vanadium using the LNL two-stage light-gas gun.** Gathers, G.R.; Mitchell, A.C.; Holmes, N.C. (Lawrence Livermore National Lab., CA (USA)). 1 Jul 1983. Contract W-7405-ENG-48. 6p. (CONF-830719—5). NTIS, PC A02/MF A01. Order Number DE83015455.

From Topical conference on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

Hugoniot measurements on vanadium have been made using the LLNL two-stage light-gas gun. The direct collision method with electrical pins and a tantalum flyer accelerated to 6.28 km/s was used. Alt'shuler, et. al., have reported Hugoniot measurements in vanadium using explosives and the impedance match method. They reported a kink in the U/sub s/ - U/sub p/ relationship at 183 GPa, and attribute it to electronic transitions. The upper portion of their curve is based on a single point at 339 GPa. The present work was performed to further investigate the equation-of-state in the high-pressure range.

44202 **Comparison of secondary electron yields from accelerated water cluster ions ($M/z<50\ 000$) striking Al_2O_3 and copper surfaces.** Beuhler, R.J. (Department of Chemistry, Brookhaven National Laboratory, Upton, New York 11973). *Journal of Applied Physics;* **54**: No. 7, 4118-4126(Jul 1983).

A comparison of the yields of secondary electrons (γ) ejected by water cluster ions, with M/z ratios from 18 to 49 000 and kinetic energies from 40 to 250 kV, striking copper and aluminum oxide surfaces is detailed. For clusters striking Al_2O_3 with M/z in the range 21 000—49 000, threshold velocities of 1×10^6 cm/sec were observed, lower than previously measured values from Cu. Threshold for secondary electron emission for cluster ions occurs when the estimated depth of penetration, based on standard stopping power formulae, is less than one atomic layer. For the oxide surface it is shown that the electron yields do not obey an additive relationship. The yields are always less than one would predict by summing the electron yields from each water molecule in the cluster. Lack of additivity is also shown in the yields resulting from small water clusters striking Cu. Electron yields from both surfaces are compared to a model which relates γ to the energy deposited in the target within the electron escape depth. For the oxide surface, a reduced electron yield can be qualitatively explained by the formation of a positive charge at the surface which can retard the escape of secondary electrons. Some implications for the practical use of these two surfaces as detection dynodes in high molecular weight mass spectroscopy are discussed.

44203 **Location of deuterium in α-scandium.** Saw, C.K.; Beaudry, B.J.; Stassis, C. (Ames Laboratory and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 12, 7013-7017(15 Jun 1983). Contract W-7405-ENG-82.

Neutron-diffraction techniques have been used to study the location of deuterium in a single crystal of ScD/sub x/ (x = 0.33; measured cell parameters: a = 3.338 +- 0.002 A and c = 5.299 +- 0.008 A). To compare under identical conditions the thermal factors of Sc in ScD/sub x/ to those of pure Sc, measurements were also performed on single crystals of pure Sc (cell parameters: a = 3.3088 +- 0.0002 A and c = 5.2680 +- 0.0003 A). The integrated reflectivities of forty reflections (with $\sin\theta/\lambda <$ or ≈ 0.7 A^{-2}) of both ScD/sub x/ and pure Sc were measured at room temperature. We find that the deuterium atoms in ScD/sub x/ occupy, within the limits of experimental precision, the tetrahedral sites of the host lattice, a result in contradiction with that obtained in a NMR study of this system. The temperature factors of Sc in pure Sc and in ScD/sub x/ were found to agree to within experimental precision. This observation indicates that the addition of deuterium does not appreciably affect the low-frequency vibrational modes of the host metal.

44204 **Structural, elastic, and transport anomalies in molybdenum/nickel superlattices.** Khan, M.R.; Chun, C.S.L.; Felcher, G.P.; Grimsditch, M.; Kueny, A.; Falco, C.M.; Schuller, I.K. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 12, 7186-7193(15 Jun 1983).

Metallic superlattices of nickel and molybdenum have been synthesized for a wide range of layer thicknesses by alternate sputtering. X-ray examination shows that they are composed of layers of fcc nickel and bcc molybdenum oriented along [111] and [110] directions, respectively. Anomalies have been observed in the lattice spacings, elastic moduli, and electrical resistivity versus modulation wavelength. These anomalies occur simultaneously at the same superlattice wavelength. The anomalies have been interpreted as due to strains in the nickel lattice.

44205 **Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons.** Schultz, P.J.; Lynn, K.G.; Frieze, W.E.; Vehanen, A. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 11, 6626-6634(1 Jun 1983).

Positron emission from a W(110) single crystal has been studied as a function of copper coverage utilizing a variable-energy positron beam in conjunction with low-energy electron diffraction and Auger-electron spectroscopy. Evidence is presented that indicates that sig- p nificant positron localization occurs at defects associated with the Cu/W(110) interface, which can be removed by high-temperature annealing. Our data also reveal new information about the islanding of copper on tungsten, providing a reliable means of identifying and quantifying the relative two-dimensional coverage of the surface by these islands.

44206 **Line-shape analyses of XVV Auger spectra of p(1 x 1)-V_3Si(00): Evidence for autoionization emission.** Zajac, G.; Zak, J.; Bader, S.D. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 11, 6649-6661(1 Jun 1983).

In the light of recent advances in understanding the Auger process, the local electronic structural origins of selected core-valence-valence (XVV) Auger line shapes are analyzed for a transition-metal silicide prototype, V_3Si. We report for clean p(1 x 1)-V_3Si(100) Auger spectra that include the region of the vanadium M/sub 2,3/VV and M_1VV and the Si L/sub 2,3/VV transitions. We compare the measured line shapes to spectra we generated based on the muffin-tin local density of states (DOS) calculated self-consistently by Klein et al. Good agreement in both the Si pp(L/sub 2,3/M/sub 2,3/M/sub 2,3/) and the V dd(M/sub 2,3/M/sub 4,5/M/sub 4,5/) peak positions between experiment and calculation verified that the final-state hole-hole repulsion for Si (U/sub p/p) and V (U/sub d/d) are both ~0 eV. Also, the Si L/sub 2,3/VV spectrum resembles that of elemental Si in that the line shape is predominantly a self-fold of the Si 3p DOS. However, an unexpected result is that the V spectral region above the M/sub 2,3/VV threshold possesses a broad (~30-eV-wide) intense feature that is not amenable to conventional interpretation in terms of the M_1VV transition or M/sub 2,3/VV double-ionization or plasmon-gain satellites. We attribute this observation to the presence of Fano autoionization emission associated with deexcitation of the resonant 3p→3d transition. Supporting evidence comes from a comparison of our p x-ray- and electron-stimulated Auger spectra, and to the line shape of the 3p loss spectrum. In addition, oxygen-dosing Auger and x-ray photoelectron spectroscopy experiments p (0—20 L) (1 langmuir = 1 L = 10^{-6} Torr sec) indicate dramatic Si L/sub 2,3/VV line-shape changes associated with oxidation, similar to that observed previously for Pd_4Si. The initial oxidation rate is ~10^2 faster than that for elemental Si.

44207 **Interdiffusion in β phase Cu—Al alloys.** Romig, A.D. Jr. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **54**: No. 6, 3172-3175(Jun 1983). Contract AC04-76DP00789.

The diffusion behavior of β phase Cu—Al has been studied at 800, 850, and 950 °C using the experimental approach and analysis scheme of Kirkendall and Darken. Diffusion couples were made using the window frame technique and concentration profiles were determined by electron probe microanalysis. The chemical diffusion coefficient, D was found to be D = 0.65 exp(-42200/RT) cm^2/s. The diffusivity was observed to be independent of composition over the range 11—13 wt. % Al. The self-diffusion coefficients D/sub Cu/ and D/sub Al/ were determined to be D/sub Al/ = 0.13 exp(-38900/RT) cm^2/s and D/sub Cu/ = 2.2 exp(-43400/RT) cm^2/s. All activation energies are in calories/mole.

44208 **Evidence for plasma jet formation in long-pulse laser irradiation of thin planar Al targets.** Anthes, J.P.; Matzen, M.K. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **54**: No. 6, 3438-3442(Jun 1983).

Thin planar aluminum targets were irradiated with 8-nsec-duration low-intensity (~3 x 10^{13} W/cm^2) glass laser pulses in order to analyze the plasma expansion from both the front and back-target surfaces. An array of vacuum-ion calorimeters and Faraday cup charge collectors was used to determine the conversion from incident laser energy to plasma kinetic energy and to determine the ion mass balance of the laser-produced plasma. Our experimental results do not agree with the ablation structure predicted by simple models or 1-D numerical simulations. The experimental results and 2-D calculations indicate that a jet of plasma forms on the back target surface and ablative acceleration of these thin-foil targets does not occur.

44209 **Corrosion-resistant uranium.** Bell, R.T.; Hovis, V.M.; Kollie, T.G.; Pullen, W.C. (to Dept. of Energy). US Patent 4,385,943. 31 May 1983. Filed date 21 Oct 1981. vp. PAT-APPL-313414.

The present invention is directed to the protecting of uranium and uranium alloy articles from corrosion by providing the surfaces of the articles with a layer of an ion-plated metal selected from aluminum and zinc to a thickness of at least 60 microinches and then converting at least the outer surface of the ion-plated layer of aluminum or zinc to aluminum chromate or zinc chromate. This conversion of the aluminum or zinc to the chromate form considerably enhances the corrosion resistance of the ion plating so as to effectively protect the coated article from corrosion.

44210 **Persistent optical excitation to Rydberg states: Xe on Au.** Eberhardt, W.; Zangwill, A. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 10, 5960-5966(15 May 1983).

Auger-electron-yield measurements of a monolayer of Xe adsorbed onto a polycrystalline Au film are presented which show transitions from the Xe 4 levels to Rydberg-derived final states with essentially their gas-phase oscillator strength. These results are contrary to a charge-transfer instability model used to explain the

lack of corresponding excitation strength from the Xe 5p subshell to similar final states. Both experimental observations are rationalized using a dielectric response model.

44211 **Calculation of high-pressure phases of Al.** Lam, P.K.; Cohen, M.L. (Department of Physics, University of California, Berkeley, California 94720). *Physical Review [Section] B: Condensed Matter;* 27: No. 10, 5986-5991(15 May 1983).

Possible high-pressure phases of Al are examined by comparing the total energies for three structures: fcc, bcc, and hcp. The energies are calculated using the density-functional formalism and the ab initio self-consistent pseudopotential approach. At zero pressure, the most stable structure is the fcc structure in agreement with experiment. At about 2 Mbar, the hcp structure is predicted to be the most stable, while at about 4 Mbar, the bcc structure is the most stable. The stability of the bcc phase at compressed volume is found to be caused by the lowering of the d states. This conclusion is based on an analysis of the occupancy of s, p, and d states at normal and compressed volumes.

44212 **de Haas—van Alphen effect in Sc metal.** Schirber, J.E.; Switendick, A.C.; Schmidt, F.A. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Physical Review [Section] B: Condensed Matter;* 27: No. 10, 6475-6477(15 May 1983). Contract AC04-76DP00789.

The first de Haas—van Alphen measurements on Sc are reported. A modified band structure is proposed to account for the very unexpected results.

44213 **Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_2 alloy.** Wire, M.S.; Stewart, G.R.; Johanson, W.R.; Fisk, Z.; Smith, J.L. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] B: Condensed Matter;* 27: No. 10, 6518-6521(15 May 1983).

The compound UAl_2 exhibits ferromagnetic spin fluctuations at low temperatures. When 15 at. % La is substituted for U in UAl_2, we find the low-temperature magnetic susceptibility increases by more than a factor of 2. We have also measured specific heat on this sample at low temperatures. We find that the electronic density of states has increased by 60% and the spin-fluctuation contribution has increased by a factor of 2. We conclude from these measurements that the Stoner enhancement factor has increased by ~30% and the spin-fluctuation temperature has increased by ~50% as compared with UAl_2. In addition, we have measured the electrical resistivity of U/sub 0.85/La/sub 0.15/Al_2 We find the residual resistivity to be approximately an order of magnitude larger than that of UAl_2. We attribute this effect to the breaking of U—U bonds by the La atoms.

44214 **Atomic geometry and surface-state spectrum for Ge(111)-(2 x 1).** Northrup, J.E.; Cohen, M.L. (Department of Physics, University of California, Berkeley, California 04720). *Physical Review [Section] B: Condensed Matter;* 27: No. 10, 6553-6556(15 May 1983).

The π-bonded chain model is studied for Ge(111)-(2 x 1). The minimum-energy chain geometry is found with the use of the Hellmann-Feynman forces. A buckling of the surface atoms in the chain is energetically favorable. This buckling is associated with rehybridization (sp^3 to sp^2) effects. Theoretical surface-state dispersions for this geometry are compared with recent angle-resolved photoemission experiments.

44215 **High-resolution photothermal ionization spectroscopy of lithium-related shallow donors in germanium.** Darken, L.A. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review [Section] B: Condensed Matter;* 27: No. 10, 6564-6567(15 May 1983). Contract W-7405-ENG-26.

High-resolution (0.10 cm^{-1} full width at half maximum) photothermal ionization spectroscopy has resolved the ground-state splitting of interstitial lithium into a singlet (E/sub 1S/(A_1)-E +- = 66.61 cm^{-1}) and a triplet (E/sub 1S/(T_2)-E +- = 66.98 cm^{-1}, and resolved four different 1S states of the D(Li,O) complex: E/sub 1S/-E +- = 61.75, 66.54, 67.05, and 70.50 cm^{-1}. In silicon-rich samples with [Li]>[O], a new complex, D(Li, X), was observed with E/sub 1S/-E +- = 70.72 and 67.24 cm^{-1}.

44216 **Electron and positron response to atomic defects in solids: A theoretical study of the monovacancy and divacancy in aluminum.** Chakraborty, B.; Siegel, R.W. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* 27: No. 8, 4535-4552(15 Apr 1983). Contract W-31-109-ENG-38.

A formalism for self-consistently calculating the response of electrons and positrons to atomic defects in solids is presented. The formalism can be used with either the Green's-function or supercell method for calculating defect characteristics, and is of general applicability. With the use of this formalism and the self-consistent pseudopotential scheme within a supercell, the electronic structure and positron states and annihilation characteristics associated with the monovacancy and divacancy in aluminum have been studied. The sensitivity of the calculated monovacancy electronic structure and formation energy to the type of ionic pseudopotential used is also examined. Finally, the possibilities for using positron-annihilation spectroscopy to study the electronic structure of vacancylike defects are considered.

44217 **Site determination for palladium on niobium using angle-resolved photoemission.** El-Batanouny, M.; Strongin, M.; Williams, G.P. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] B: Condensed Matter;* 27: No. 8, 4580-4585(15 Apr 1983).

We demonstrate the possibility of using angle-resolved photoemission from valence levels to gain overlayer site geometry information. To do this we utilize and discuss polarization effects and photoexcitation cross-section effects (as a function of the photon energy). To illustrate the application of the technique we have studied Pd overlayers on Nb(110) and conclude that the Pd(110) overlayer has a hollow-site geometry.

44218 **Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001).** Tong, S.Y.; Kang, W.M.; Rosenblatt, D.H.; Tobin, J.G.; Shirley, D.A. (Laboratory for Surface Studies and Department of Physics, University of Wisconsin-Milwaukee, Wisconsin 53021). *Physical Review [Section] B: Condensed Matter;* 27: No. 8, 4632-4636(15 Apr 1983). Contract W-7405-ENG-48.

Calculated energy-dependent photoelectron-diffraction (EDPD) curves for oxygen-nickel perpendicular spacings (d/sub perpendicular/) between 0.0 and 1.2 A are presented and compared with experimental data for the c(2 x 2)O-Ni(001) system. Using a normalized R factor, we found that the only acceptable agreement is for d/sub perpendicular/ spacings in the range 0.78—0.90 A. The experimental observation that adsorbate-induced modulations remain strong over a wide energy range in EDPD curves, but not in low-energy electron-diffraction intensity curves, is explained.

44219 **Reflectance spectra and dielectric functions for Ag in the region of interband transitions.** Leveque, G.; Olson, C.G.; Lynch, D.W. (Ames Laboratory and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review [Section] B: Condensed Matter;* 27: No. 8, 4654-4660(15 Apr 1983). Contract W-7405-ENG-82.

New measurements have been made of the reflectances of single crystals of Ag and of Ag films in the (3.5—30)-eV range. The data were analyzed with the Kramers-Kronig method and the resultant dielectric functions were compared with those in the literature and with recent calculations. We find all structures previously seen, and a new weak peak at 11.5 eV. Our magnitudes for ϵ_2 are in considerably better agreement with those of the calculated spectra than are those in the literature. Second-derivative spectra of the absorption coefficient have been calculated and compared with previously measured thermotransmission spectra, showing the latter to arise primarily by temperature-dependent broadening.

44220 Electric field gradient of single impurities in aluminum. Kahn, L.M.; Perrot, F.; Rasolt, M. (Physics Department, University of Rhode Island, Kingston, Rhode Island 02881). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 8, 5110-5112(15 Apr 1983).

Single substitutional impurities of Mg, Zn, Ga, Ge, and Si in Al universely show very small electric field gradients at the second-nearest-neighbor sites, in obvious disagreement with theoretical calculations. We show that this does not likely reflect the neglect of nonspherical contributions to the induced charge density around the impurity.

44221 Two critical points on the γ-α phase boundary of cerium alloys. Thompson, J.D.; Fisk, Z.; Lawrence, J.M.; Smith, J.L.; Martin, R.M. (Center for Materials Science, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **50**: No. 14, 1081-1084(4 Apr 1983).

It is shown that the P-T diagram for the γ-α phase transition in Ce/sub 0.8/La/sub 0.1/Th/sub 0.1/ has two critical points with first-order transitions between them. This phase diagram follows from the Fermi-liquid properties of the 4f electronic system, the experimentally known volume dependence of K/sub B/T/sub FL/, and the dilution effect of alloying.

44222 Effects of self-annealing and reirradiation on the specific heat of Nb_3Al. Cort, B.; Stewart, G.R.; Snead, C.L. Jr.; Sweedler, A.R.; Moehlecke, S. (Los Alamos National Laboratory, Los Alamos, New Mexico). *Journal of Low Temperature Physics;* **51**: No. 1, 179-188(1 Apr 1983).

Specific heat measurements have been made on two reirradiated samples of A15 Nb_3Al. Results of the present work are consistent with those of our earlier work on neutron-irradiated A15 Nb_3Al, with the exception that there is no correlation between fluence and superconducting transition width.

44223 f-band dispersion in UIr_3: An angle-resolved and resonant photoemission study. Arko, A.J.; Koelling, D.D.; Reihl, B. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 7, 3955-3961(1 Apr 1983).

Angle-resolved photoemission measurements using synchrotron radiation have been made on a UIr_3(100) face. With the use of the Fano resonance at the 5d absorption edge, the 5f emission was extracted and found to agree well with a calculated 5f density of states. Dispersion was observed for the first time in a photoemission peak clearly associated with 5f emission. The dispersion is generally in good agreement with calculated energy bands.

44224 Simple scaling behavior in the magnetic susceptibility of $CeSn_3$ under high pressure. Shaheen, S.A.; Schilling, J.S.; Liu, S.H.; McMasters, O.D. (Experimentalphysik IV, Universitat Bochum, 4630 Bochum 1, West Germany). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 7, 4325-4335(1 Apr 1983).

The static magnetic susceptibility chi of single-crystalline $CeSn_3$ is measured as a function of temperature 3< or =T< or =300 K and hydrostatic pressure 1 bar< or =P< or =15 kbar. The temperature and pressure dependence of chi is shown to be a function of a single characteristic spin-fluctuation energy kT/sub sf/, i.e., chiT scales with T/T/sub sf/. From the magnitude of the increase of T/sub sf/ with pressure (partialln T/sub sf//partialP≅+1.4%/kbar or partialln T/sub sf//partialln V≅-7.6) it can be indirectly inferred within a simple model that an increase in the 4f hybridization width Δ, rather than a decrease in the 4f binding energy ϵ/sub ex/, is the dominant change in the magnetic state under pressure. These results imply that $CeSn_3$ would be best characterized as a trivalent Ce compound with a rather high spin-fluctuation temperature (T/sub sf/≅200 K) rather than as a compound with fractional valence. chi(T) appears to depend only very weakly on the relative orientation of the magnetic field. The Curie tail in chi(T) below 20 K is independent of pressure and is, therefore, very likely an impurity effect rather than an intrinsic property of the compound. It is suggested that scaling itself can be used to derive changes in both the valence v and T/sub sf/ in a single experiment.

44225 Solitons in quantum-spin systems. Chui, S.T.; Ma, K.B. (Bartol Research Foundation, University of Delaware, Newark, Delaware 19711). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 7, 4515-4517(1 Apr 1983).

Numerical results such as the specific heat, magnetic susceptibility, ground-state energy, and the magnon gap obtained with computer renormalization-group techniques are presented for $CsNiF_3$. No soliton states of the type analogous to the sine-Gordon kink were found. This is supported by analytic calculations of the quantum fluctuations of a winding number operator.

44226 Electronic density of states and T/sub c/ in Nb_3Sn under pressure. Lim, K.C.; Thompson, J.D.; Webb, G.W. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 5, 2781-2787(1 Mar 1983).

We have determined the effect of hydrostatic pressure on the electronic heat-capacity coefficient γ of transforming Nb_3Sn through measurements of the superconducting transition temperature T/sub c/, the temperature derivative of the upper critical field near T/sub c/, and the residual resistivity. We find that γ and the bare density of electronic states are suppressed by pressure. Results are discussed in terms of a pressure-dependent d-band occupancy. From an analysis of the density-of-states change under pressure, we infer the existence of a substantial electronic contribution to the Grueneisen parameter of Nb_3Sn.

44227 Positron annihilation studies of molybdenum irradiated by protons, neutrons or electrons. Howell, R.H. (Lawrence Livermore National Lab., CA (USA)). pp 449-451 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Annealed molybdenum was irradiated at room temperature by energetic protons or neutrons and the fluence and recoil energy dependence of two traps was measured. Comparison of trapping rates with calculations of damage energy correlates high energy recoils with the short lifetime trap and low energy recoils with the longer lifetime.

44228 Recovery of deformed and hydrogen-charged palladium. Snead, C.L. Jr.; Lynn, K.G.; Lynch, J.F. (Brookhaven National Lab., Upton, NY (USA)). pp 483-485 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Positron lifetime and Doppler-broadening studies made at 300 K have been used to investigate the interaction between interstitial hydrogen and lattice defects in deformed Pd. Specimens were charged with hydrogen at 300 K to levels up to 0.1%. The presence of hydrogen was found to have no effect on the recovery curves of Pd upon annealing to 400°C. By 400°C the values for both lifetime and Doppler-broadening for both cold worked and cold worked plus hydrogen were below the values obtained for annealed pure Pd. This can be interpreted as gaseous-impurity-trapped vacancies being present after the 1200°C anneal, but being swept away by the dislocation microstructure recovery between 200-400°C. Although the specimens hydrided to the β phase and outgassed back to the α phase showed continual recovery up to 400°C, complete recovery was not achieved as with the deformed specimens. The lifetime results indicate the presence of defects more open than single vacancies. One possibility would be the formation of cavities, possibly hydrogen filled, during the hydriding that are stable at 400°C.

44229 Positron studies of solute clustering and lattice defects in Al-Zn alloys. Alam, A.; West, R.N. (East Anglia Univ. (UK). School of Mathematics and Physics); Leighly, H.P. (Missouri Univ., Rolla (USA)). pp 500-502 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

The authors report studies of the annealing behaviour of Al-Zn alloys quenched from 850 K to 200 K or heavily deformed at 77 K. The measured annealing curves provide clear evidence of positron trapping at both open volume defects and at Zn-rich clusters and their analysis provides insight into the formation and dissolution phenomena.

44230 Positron annihilation measurements of vacancy formation in Ni and Ni(Ge). Smedskjaer, L.C.; Fluss, M.J.; Legnini, D.G.; Chason, M.K.; Siegel, R.W. (Argonne National Lab., IL (USA)). pp 526-528 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Vacancy formation in Ni and in dilute Ni(Ge) alloys was studied under thermal equilibrium conditions using positron annihilation Doppler-broadening. A monovacancy formation enthalpy of 1.8 +- 0.1 eV was determined for pure Ni; combining this result with that from previous tracer self-diffusion measurements, a monovacancy migration enthalpy of 1.1 +- 0.1 eV was also deduced. Analysis of the vacancy formation measurements in Ni(0.3 at.% Ge) and Ni(1 at.% Ge) yielded a value for the vacancy-Ge binding enthalpy of 0.20 +- 0.04 eV.

44231 Structural changes observed in (Mosub(.6)Rusub(.4))sub(x)Bsub(1-x) amorphous alloys observed with positron annihilation. Howell, R.H. (Lawrence Livermore National Lab., CA (USA)); Johnson, W.L. (California Inst. of Tech., Pasadena (USA)). pp 576-578 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Changes in the structure of (Mosub(.6)Rusub(.4))sub(x)Bsub(1-x) amorphous alloys were observed in positron annihilation analysis using both positron lifetime and Doppler broadening techniques. The changes were introduced into the alloy either by varying the boron fraction or by neutron irradiation. Similar results were observed both in the irradiated alloys and those with vacant boron sites. The positron annihilation data suggest that the modified structure contains regions of open volume and that the positrons interact with those regions.

44232 Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g). Chuang, S.Y. (Texas Univ., Arlington (USA). Center for Positron Studies); Chen, H.S. (Bell Labs., Murray Hill, NJ (USA)). pp 590-591 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Doppler broadening measurements have been made on two metallic glasses, $Pd_{77}Cu_6Si_{17}$ and (Ptsub(.8)Nisub(.2))$_{73}P_{27}$, at temperatures from room temperature up to crystallizstion temperature of the samples. Both alloy glasses show the line-shape parameter (S) of the Doppler spectrum, defined as the central area (511 +- 0.86 keV) of the peak divided by the total area of spectrum, a sudden increase above the glass transition temperature Tsub(g) as a result of an increasing free volume. The S parameter decreases at higher temperature upon crystallization. The increase of S parameter above Tsub(g) suggests that metallic glasses, if they contain defects, either the defects would be smaller in volume than vacancies, or the number of vacancy-like defects would be negligible.

44233 Positron annihilation studies of phase transitions in ferromagnetic and antiferromagnetic crystals. Hsu, F.H.; Liu, S. (Georgia State University, Atlanta (USA). Dept. of Physics and Astronomy); Vance, E.R. (Pennsylvania State Univ., University Park (USA). Materials Research Lab.). pp 719-720 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Positron annihilation techniques have been widely used for the study of phase transitions in molecular substances and in polymers. The present investigations were undertaken to determine whether positron annihilation lifetimes can be used in the study of phase transitions in other groups of materials, namely: ferromagnetic and antiferromagnetic crystals. The authors have chosen Gd (ferromagnetic) and Cr_2O_3 (antiferromagnetic). Lifetime spectra have been measured from 250 K to 340 K for Gd and from 280 K to 350 K for Cr_2O_3. In each case the Curie temperature was in the middle of the range. The temperature dependence of the annihilation spectra was small, but there was definitely a marked change at the Curie temperature for Gd. However, there was no noticeable change near the Curie temperature for Cr_2O_3.

44234 Investigations of defective β-NiAl by transmission electron microscopy. Liu, H.C.; Chang, E.; Mitchell, T.E. (Case Western Reserve Univ., Cleveland, OH). pp 58-59 of Thirty-ninth annual proceedings of the Electron Microscopy Society of America. Bailey, G.W. (ed.). New York, NY; Electron Microscopy Society of America (1981). Contract AC02-76ER02119.

The β-NiAl phase covers 46 to 60 at. % Ni. Defect structures in 45 to 60 at. %. Ni were studied by electron diffraction in TEM. Results indicate short-range ordering of Ni sublattice vacancies in Ni-poor NiAl. Diffuse streaks along the <110> and <112> directions are probably due to displacement disorder. Very fine striated contrast occurs from small transformed martensitic domains in 58 and 60 at. % Ni. (DLC)

44235 Positron annihilation as a technique for dislocation line studies. Smedskjaer, L.C.; Manninen, M.; Fluss, M.J. (Argonne National Lab., Il). pp 473-485 of Advanced techniques for characterizing microstructures. Wiffen, F.W.; Spitznagel, J.A. (eds.). New York, NY; American Institute of Mining, Metallurgical, and Petroleum Engineers, Inc. (1981).

Positron annihilation spectroscopy (PAS) is an established technique for the study of point-defect behavior. Following the initial observation of positron annihilation in voids, PAS has also become useful for the study of defect clusters. Additionally, PAS may be a useful technique for the study of dislocations. Recently observed anomalies in the temperature dependence of PAS signals at low temperatures in annealed metals can tentatively be attributed to a positron-dislocation interaction, in which the detailed properties of the dislocation-line structure and its associated defects (e.g., jogs) alter the PAS signal and its temperature dependence. This new interpretation of the positron-dislocation interaction assumes that the positron-dislocation line binding energy is small $\lesssim$ 0.1 eV). It will be shown that such an assumption may lead to a strong temperature dependence of the positron trapping rate at low temperatures. Since such a temperature dependence is sensitive to the number of jogs per unit length of the dislocation line, PAS may be

a new technique for studying dislocation-line structures such as jobs, thereby augmenting current microscopy methods.

44236 **(K-Trans—209) Galvanic dispersion coatings increase the service life of tools used in plastic processing.** Metzger, W.; Florian, T. Translated from *Plastverarbeiter ;* 30: No. 3, 142-145(Jan 1979). Contract W-7405-ENG-26. 14p. NTIS, PC A02/MF A01. Order Number DE83014106.

Portions are illegible in microfiche products.

The Kanisil coatings consist of a nickel-phosphorus alloy with approximately 15% by volume of embedded silicone carbide powder. They are precipitated on many metallic materials and some plastics using well-developed commercial processes. The service life of tools used in plastic and synthetic fiber processing is increased considerably by means of 50 μ thick Kanisil coatings. The savings resulting from reductions in the time lost for tool changes, the lower repair costs for the tools and the lower discolored figures are considerable.

44237 **(K-Trans—197) Electrochemical behavior of a pyrophosphate-borohydride electroless nickel plating bath.** Ono, I. Translated from *Kinzoku Hyomen Gijutsu ;* 30: No. 7, vp(1979). Contract W-7405-ENG-26. 14p. NTIS MF A01. Order Number DE83013809.

Microfiche only, copy does not permit paper copy reproduction.

This study examines plating rate estimations based on electrochemical analysis as well as polarization activity for electroless nickel plating baths that utilize borohydride as a reducing agent and pyrophosphate as a complex agent.

44238 **(K-Trans—211) Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings.** Schmeling, E.L.; Pohl, M.; Burchard, W.G. Translated from *Metalloberflaeche ;* No. 7, 281-284(1978). Contract W-7405-ENG-26. 12p. NTIS, PC A02/MF A01. Order Number DE83014128.

Tests on nickel boron and nickel phosphorus coatings deposited with no external current have shown that the examined Ni-B platings are composed essentially of lobar-tipped Ni-B crystallites growing epitaxially perpendicular to the material surface. These crystals issue as points from the nickel nuclei distributed over the base surface. Since the crystals intertwine to a very small degree with increasing coating thickness, gaps and pores occur which run clear down to the base material. Coatings of this type have very little adhesion and can protect the base material very little from corrosion. The latter is especially pertinent in media of high conductance. In contrast, the examined Ni-P coatings have proven to be homogeneous and to have no coating faults caused by coating growth. This then explains its high degree of protection against corrosion. It was further documented by means of SEM studies of rupture surfaces that Ni-P coatings possess outstanding adhesion to steel bases. Also, in contrast to Ni-B coatings, platings of Ni-P coatings cover surfaces quickly in the immersion phase of the plating process and guarantee a good bonding of the nickel coating to the base material.

44239 **(ORNL-tr—4990) Electro-slag casting of steel.** Paton, B.E.; Medovar, B.I.; Bojko, G.A. Translated from *Fonderie (Paris) ;* No. 340, 435-442(Dec 1974). Contract W-7405-ENG-26. 17p. NTIS, PC A02/MF A01. Order Number DE83013802.

Portions are illegible in microfiche products.

The electro-slag casting method assures both the continuous melting and the casting of the metal inside the same unit that comprises both the furnace and the mold. A consumable steel electrode is melted by the effect of the heat created in the electro-conducting slag by passing a current through it. The metal melted at the end of the electrode submerged in the slag then goes into the mold without any contact with the air. The slag bath purifies the metal and effectively protects it from oxidation. Electro-slag casting is more effective than classic casting due to the fact that its use does not require [melting] furnaces, casting pockets, or sand molds. The part is produced without deadhead and the feed system is eliminated. This method is used successfully in the production of high-priced parts for difficult applications: connecting-rod blanks for Diesel ship motors, crankshafts, for example.

44240 **(K-Trans—214) Copper plating of iron and steel wires by cementation.** Oei, H.Y. Translated from *Draht ;* 22: No. 6, 382-386(1971). Contract W-7405-ENG-26. 16p. NTIS MF A01. Order Number DE83014116.

Microfiche only, copy does not permit paper copy reproduction.

The article discusses the copper plating of iron and steel wires by concentration. Beside an introduction in the treatment procedure as used in the wire industry, some theoretical considerations of the mechanism of copper deposition are presented. Experimental results regarding the effect of electroless coppering on various factors such as bath composition, temperature, time and iron increase in the bath, as well as morphological studies on electroless copper layers should facilitate an understanding of electroless copper plating.

3602 Ceramics, Cermets, And Refractories

REFER ALSO TO CITATION(S) 43384, 43384, 43384, 43800, 43819, 44202, 44233

44241 **(BMFT-FB-T—83-062) Further development and production of silicon carbide powders for pressureless sintering.** Schwier, G. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 16p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83751040.

In the course of the second phase of this programm improved silicon carbide powders had been developed for sintering and hotpressing. For proper densification of SiC suitable sintering aids as well as, sinter active SiC powders are required. For high-temperature application these powders have to have a high purity tóo. Alpha- and Beta-SiC powders have been manufactured. Beta-phase SiC is produced by carburisation of suitable Si powders, Alpha-phase SiC is taken from commercial Acheson-SiC material. From both intermediates, sinter active fine powders are produced by wet milling. The high purity of the powders is guaranteed by chemical purification of the powders. Especially by reducing the oxygen content and by determining the suitable powder fineness, the sintering properties could be improved.

44242 **(CONF-820659—11) Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$.** Yang, K.N.; Lambert, S.E.; Hamaker, H.C.; Maple, M.B.; Mook, H.A.; Ku, H.C. (California Univ., San Diego, La Jolla (USA). Inst. of Pure and Applied Physical Sciences; Oak Ridge National Lab., TN (USA); National Tsing Hua Univ., Hsinchu (Taiwan). Dept. of Physics). Nov 1982. Contract W-7405-ENG-26. 6p. NTIS, PC A02/MF A01. Order Number DE83014625.

From 4. conference on superconductivity in d- and f-band metals; Karlsruhe, F.R. Germany (28 Jun 1982).

Portions are illegible in microfiche products.

An investigation of the nature of magnetic ordering and the dependence of the magnetic-ordering temperature on x in the Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$ system has been carried out be means of low-temperature heat capacity, ac magnetic susceptibility and electrical-resistance measurements. The specific heat features associated with long-range ordering for $x \leqq 0.2$ and antiferromagnetic ordering for $x \geqq 0.5$. Unusual magnetic behavior apparently occurs for $0.2 < x < 0.5$ including two distinct magnetic-ordering transitions. The results of neutron-diffraction measurements for $x = 0.15$ are also presented.

44243 **(DOE/ER/04998—T3) Grain boundary and surface diffusion in oxide systems. Technical progress report.** Stubican, C.S. (Pennsylvania State Univ., University Park (USA). Dept. of Materials Science and Engineering). 15 Jul 1983. Contract AC02-78ER04998. 5p. NTIS, PC A02/MF A01. Order Number DE83015572.

Grain boundary, lattice, and surface diffusion of ^{51}Cr in alumina and spinel was studied. (DLC)

44244 **(UCID—19833) Equation of state of TiH_2. Progress report.** Steinberg, D.J. (Lawrence Livermore National Lab., CA (USA)). Oct 1972. Contract W-7405-ENG-48. 7p. NTIS, PC A02/MF A01. Order Number DE83015456.

There is a fair amount of apparently conflicting data on TiH_2. The purpose of this report is to explain these discrepancies and arrive at a Hugoniot for TiH_2. The best Hugoniot appears to be: U/sub s/ = 6.0 + 1.04 U/sub p/ mm/μs; and rho_0 = 3.79 gr/cc. 1 figure, 4 tables.

44245 **Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4B_4$ system.** Shelton, R.N.; Horng, H.E.; Bevolo, A.J.; Richardson, J.W.; Jacobson, R.A.; Bader, S.D.; Hamaker, H.C. (Ames Laboratory U.S. Department of Energy and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review [Section] B: Condensed Matter;* **27**: No. 11, 6703-6712(1 Jun 1983). Contract W-7405-ENG-82.

An analysis of the bonding and charge transfer as a function of transition-metal concentration is presented for the bct superconducting system Y(Rh/sub 1-x/Ru/sub x/)$_4B_4$. A sharp drop in the superconducting critical temperature T/sub c/ from 9.5 K to below 1.0 K near a critical concentration is not reflected in the smooth, linear variation of the single-crystal lattice parameters and B-B interatomic distances. Analysis of the boron KVV Auger data indicates the boron p-like states near the Fermi energy are increasingly populated in a continuous manner with increasing x. We find no evidence of any abrupt changes in the electronic structure near x/sub cr/.

44246 **Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4B_4$ superconductors.** Hamaker, H.C.; Zajac, G.; Bader, S.D. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* **27**: No. 11, 6713-6720(1 Jun 1983).

Local electronic density of states (DOS) at the boron site for Y(Rh/sub 1-x/Ru/sub x/)$_4B_4$ superconductors, with x = 0.15, 0.50, and 0.85, have been characterized by means of B KVV Auger lineshape analyses, with supporting data from x-ray- and ultraviolet-photoemission experiments and electron-energy-loss experiments. The motivation was to test Johnston's model, in which the unusually precipitous drop of the superconducting transition temperature for x> or ≈0.5 is attributed to an abrupt charge transfer to the boron site. Comparisons of the experimental Auger line shapes are made to those we have generated from band-structure calculations by Jarlborg et al. for the related compound YRh_4B_4. The Auger data reveal a continuous evolution of the B local DOS with x, which does not support the Johnston model. The analyses indicate that there is a continuous modification of the hybridization of the B p-like and the transition-metal d-like electronic states with x. We suggest that these changes in the pd hybridization may be related to a previously reported lattice distortion for this system, and that these effects directly influence the electron-phonon interaction strength.

44247 **Observation of a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2.** Behroozi, F.; Crabtree, G.W.; Campbell, S.A.; Hinks, A.D.G. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* **27**: No. 11, 6849-6852(1 Jun 1983). Contract W-31-109-ENG-38.

Detailed magnetization curves show a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2 for the temperature range 3.3> or ≈T> or ≈1.4 K when the field is parallel to the a axis, along which the crystal shows strong paramagnetism. Below 3.3 K, the discontinuity in magnetization at H/sub c/2 grows with decreasing temperature and moves to lower fields, ultimately developing into the spontaneous moment in the ferromagnetic state. In the c direction, where the crystal exhibits weak paramagnetism, the superconducting magnetization curves show ordinary type-II behavior.

44248 **Cermets and method for making same.** Aaron, W.; Kinser, D.L.; Quinby, T.C. (to Dept. of Energy). US Patent 4,383,855. 17 May 1983. Filed date 1 Apr 1981. vp.

PAT-APPL-249798.

The present invention is directed to a method for making a wide variety of general-purpose cermets and for radioactive waste disposal from ceramic powders prepared from urea-dispersed solutions containing various metal values. The powders are formed into a compact and subjected to a rapid temperature increase in a reducing atmosphere. During this reduction, one or more of the more readily reducible oxides in the compact is reduced to a selected substoichiometric state at a temperature below the eutectic phase for that particular oxide or oxides and then raised to a temperature greater than the eutectic temperature to provide a liquid phase in the compact prior to the reduction of the liquid phase forming oxide to solid metal. This liquid phase forms at a temperature below the melting temperature of the metal and bonds together the remaining particulates in the cermet to form a solid polycrystalline cermet.

44249 **Investigation of the occurrence of superconductivity below the antiferromagnetic transition in Ho(Ir/sub 0.7/Rh/sub 0.3/)$_4B_4$.** Woolf, L.D.; Lambert, S.E.; Maple, M.B.; Acker, F.; Ku, H.C.; Odoni, W.; Ott, H.R. (Institute for Pure and Physical Sciences, University of California, San Diego, La Jolla, California). *Journal of Low Temperature Physics;* **51**: No. 1, 117-134(1 Apr 1983). Contract AT03-76ER70227.

The pseudoternary compound Ho(Ir/sub 0.7/Rh/sub 0.3/)$_4B_4$, which had previously been reported to exhibit the occurrence of antiferromagnetism above the superconducting transition, has been examined using heat capacity, ac magnetic susceptibility, upper critical magnetic field, thermal expansion, magnetostriction, electrical resistance, thermal conductivity, and static magnetization measurements. The data confirm the bulk nature of the antiferromagnetic phase transition and are consistent with the presence of bulk superconductivity coexisting with magnetic order.

44250 **Type-II to type-I transition in superconducting, sputtered $ErRh_4B_4$ films.** Gray, K.E.; Zasadzinski, J.; Vaglio, R.; Hinks, D. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* **27**: No. 7, 4161-4172(1 Apr 1983). Contract W-31-109-ENG-38.

High-quality films of both the body-centered and primitive tetragonal phases of $ErRh_4B_4$ have been made by dc sputtering. Critical fields perpendicular and parallel to these films have been measured. The major result of this research is the interpretation of these measurements for the reentrant superconducting primitive phase. It is concluded that a type-II to type-I transition occurs as temperature T falls below about 2.4 K. In this way the large apparent discrepancy between parallel and perpendicular critical fields can be understood as being due to the intermediate state. The analysis also indicates that the superconducting condensation energy E/sub c/ is non-BCS and falls to a low value at the reentrant transition. However, it is necessary to extrapolate Landau parameters for the magnetic normal state to determine E/sub c/, so that this conclusion is not definite. The critical field at the upper transition temperature is reported to have an anomalous, and as yet unexplained, temperature dependence.

44251 **Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4.** Radousky, H.B.; Aldred, A.T.; Knapp, G.S.; Kouvel, J.S. (Materials Science Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* **27**: No. 7, 4236-4242(1 Apr 1983).

The magnetization, susceptibility, heat capacity, and upper critical field (H/sub c/2) versus temperature (T) curves have been determined for the Y/sub 0.9/R/sub 0.1/Rh_4B_4 system with R = Gd, Dy, Ho, Er, and Tm. These materials allow the effects of the different magnetic rare earths on the superconducting properties of the host material to be studied at a dilute concentration, where no long-range magnetic order has been observed. The Ginzburg-Landau parameters ξ/sub GL/ and λ/sub GL/ have been obtained

from the values of the heat-capacity coefficient γ, (dH/sub c/2/dT)= T/sub c/, and T/sub c/. These parameters, which are derived from the data near T/sub c/ and at low fields, are relatively insensitive to the particular rare-earth ion. At higher values of H/T (roughly-equal1 kOe/K) the H/sub c/2-vs-T curves show dramatic differences which can be correlated with the type of order (superconducting or ferromagnetic) that occurs in the RRh_4B_4 compounds. For R = Gd, Dy, and Ho, which order ferromagnetically in the concentrated compounds, the curves are seen to bend over sharply with increasing H/T, whereas for R = Er and Tm, which are superconducting in the concentrated compounds, the H/sub c/2-vs-T curves are very similar to that of nonmagnetic YRh_4B_4. In addition, the critical-field curves show that the crystal fields strongly affect the response of the rare-earth ions in a magnetic field, which in turn determines the magnetic transition temperatures of the RRh_4B_4 compounds.

44252 **Effect of superconductivity on spin dynamics in (Y/sub 1-x/R/sub x/)Rh_4B_4.** Kumagai, K.; Fradin, F.Y. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* **27**: No. 5, 2770-2780(1 Mar 1983). Contract W-31-109-ENG-38.

An adiabatic—field-cycle method for ^{11}B nuclear magnetic relaxation has been used to study the spin dynamics of rare-earth ions in dilute (Y/sub 1-x/R/sub x/)Rh_4B_4. Longitudinal dipolar fluctuations of rare-earth moments are found to be the main source for the spin-lattice relaxation time of ^{11}B. The variation of T_1 in the superconducting state is attributed to the reduction of the electronic spin-relaxation time tau/sub m/, which is mainly determined by the Ruderman-Kittel-Kasuya-Yosida (RKKY) interaction mediated by the conduction electrons. The remarkable reduction of the RKKY coupling below T/sub c/ is discussed in connection with the reduction of the conduction-electron spin susceptibility chi(q).

44253 **Neutron-diffraction study of the magnetic ordering in superconducting $TmRh_4B_4$.** Majkrzak, C.F.; Satija, S.K.; Shirane, G.; Hamaker, H.C.; Fisk, Z.; Maple, M.B. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] B: Condensed Matter;* **27**: No. 5, 2889-2893(1 Mar 1983).

The results of neutron-diffraction measurements are reported which confirm that superconducting $TmRh_4B_4$ orders magnetically at T/sub M/≅0.7 K. The modulated antiferromagnetic structure deduced from the data is of particular interest, considering the similarity of certain other physical properties of $TmRh_4B_4$ to those of the ferromagnetic, reentrant superconductor $ErRh_4B_4$.

44254 **Correlation theory for one dynamical variable: Application to EuO and EuS.** Lindgard, P. (Riso National Laboratory, DK-4000 Roskilde, Denmark). *Physical Review [Section] B: Condensed Matter;* **27**: No. 5, 2980-2991(1 Mar 1983).

A self-consistent correlation theory is developed which is a systematic generalization of the random-phase approximation and with an equally wide range of applicability. For simplicity the theory is here given in detail for one dynamical variable. For a test of the theory static and dynamic magnetic properties for EuO and EuS for T> or =T/sub c/ are calculated. Quantitative agreement with the comprehensive and detailed experimental data is obtained for T> or =1.02T/sub c/ with no adjustable parameters. A dependence on the lattice and spin dimension as well as the value of the spin is obtained and is in agreement with high-temperature-expansion results.

44265 **Some future directions for metal hydride surface studies: electrons as probes of hydrogen.** Malinowski, M.E. (Sandia National Labs., Livermore, CA (USA)). *Journal of the Less-Common Metals;* **89**: No. 1, 1-18(Jan 1983).

From International symposium on the properties and applications of metal hydrides; Toba (Japan) (30 May - 4 Jun 1982).

Portions are illegible in microfiche products01 refs.

The current and possible future uses of electrons to detect hydrogen in metal hydride surfaces are reviewed. The available surface techniques, their sensitivity to hydrogen and the effects of electron beam damage are briefly evaluated. To underscore the utility of these "electron-only" techniques to study hydrides, the Auger electron and energy loss spectroscopic results for titanium hydride are given in some detail. As an example of the use of weak electron beam probing methods, tritium imaging, a newly developed technique for the positional detection of tritium, is described. Based on the current limited use of electron beams to probe hydride surfaces on the one hand and the variety of available techniques on the other, a widespread future application of electron beam techniques to study metal hydrides can be expected.

44256 **Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth).** Dunlap, B.D. (Argonne National Lab., IL (USA)); Niarchos, D. (Argonne National Lab., IL (USA); Illinois Inst. of Tech., Chicago (USA)). *Solid State Communications;* **44**: No. 12, 1577-1581(Dec 1982).

By analysis of a large body of available data, crystal field parameters have been obtained for compounds in the series $RERh_4B_4$ (RE = rare-earth). These parameters have then been used to calculate properties related to the electronic and magnetic properties of such compounds, and it is shown that a substantial unification of current information is obtained for properties including bulk magnetization (polycrystalline and single crystal), magnetic susceptibility, magnetic anisotropy, Schottky anomalies in the specific heat and suppression of the superconducting transition temperature due to magnetic impurities. In agreement with previous discussions crystal field effects are found to clarify the systematics of magnetic transition temperature, but not to give a full explanation. Other phenomena, such as discrepancies in the magnetic moment of $ErRh_4B_4$ as measured by neutron diffraction and by Moessbauer spectroscopy cannot be explained as crystal field related phenomena.

3603 Composite Materials

44257 **(DFVLR-FB—82-15) Stresses and deformations in laminated test specimens of carbon fiber reinforced composites.** Rohwer, K. (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)). 1982. 82p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83751154.

With 69 figs., 19 refs.

Test specimens of laminated fiber reinforced composites show edge effects not known in homogeneous materials. The finite element method is applied to calculate stresses and displacements under axial load and temperature decrease. A comparison with published results obtained on four-layer specimens proves good agreement, but makes obvious that it is essential to display the complete stress fields. Sixteen-layer specimens with three different stacking sequences are then analyzed. The stress distributions can be utilized as an orientation for design improvement.

44258 **Experimental phase diagram of lithium-intercalated graphite.** Woo, K.C.; Mertwoy, H.; Fischer, J.E.; Kamitakahara, W.A.; Robinson, D.S. (Moore School of Electrical Engineering and Laboratory for Research on the Structure of Matter, University of Pennsylvania, Philadelphia, Pennsylvania 19104). *Physical Review [Section] B: Condensed Matter;* **27**: No. 12, 7831-7834(15 Jun 1983).

First-order transitions to dilute stage 1 from stages 2—4 and from mixed stages are observed in Li-graphite compounds in the range 430—1020 K. The resulting (T,x) phase boundary agrees generally with predictions by Safran and others except for a sharp peak of very stable stage-2 compositions around x~0.4. The commensurability energy does not contribute to this peak since both low-T and high-T phases are disordered.

44259 **In/sub x/Ga/sub 1-x/As-In/sub y/Ga/sub 1-y/As strained-layer superlattices: A proposal for useful, new electronic materials.** Osbourn, G.C. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Physical Review [Section] B: Condensed Matter;* **27**: No. 8, 5126-5128(15 Apr 1983).

Strained-layer superlattices grown from lattice-mismatched layers of InGaAs are proposed as useful electronic materials with tailorable electronic properties. The first study of the electronic properties of these structures has been carried out. Band-gap ener-

gies are calculated as a function of layer thicknesses and compositions. The results demonstrate for the first time that the lattice constant, band gap, and transport properties of ternary strained-layer superlattices can be independently varied. This new capability could permit InGaAs strained-layer superlattices to significantly broaden the range of applications associated with the InGaAs ternary compound.

3604 Polymers And Plastics

REFER ALSO TO CITATION(S) 43524, 44136, 44450

44260 Optical absorption from polarons in a model of polyacetylene. Fesser, K.; Bishop, A.R.; Campbell, D.K. (Theoretical Division and Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] B: Condensed Matter;* 27: No. 8, 4804-4825(15 Apr 1983).

We present a theoretical calculation, within a continuum electron-phonon-coupled model, of the optical absorption due to polarons in polyacetylene [(CH)/sub x/]. Our results can be applied to both trans- and cis-(CH)/sub x/, as well as potentially to other polymers (polypyroles, polyparaphenylenes) in which polarons are present. We establish that the essential signature of polaron absorption is the existence of three separate absorption peaks in the gap with qualitatively different features. For trans-(CH)/sub x/, we compare and contrast this structure with that from the kink solitons, which are expected to dominate the optical absorption at all but the lowest doping levels. For cis-(CH)/sub x/ and related polymers, we discuss polaron (and multipolaron) absorption and the relation of polarons to possible excitons in these materials. Finally, we evaluate briefly the existing experimental situation regarding optical absorption in polyacetylene and indicate possible future experiments that could confirm the existence of polarons in (CH)/sub x/ and similar polymers.

3606 Other Materials

REFER ALSO TO CITATION(S) 43189, 43340, 43354, 43495, 43511, 43527, 43789, 44144, 44148, 44152, 44870, 44908, 45273

44261 (CONF-8206201—1-Draft) Hydrogen in MgO crystals thermochemically reduced at very high temperatures. Chen, Y. (Oak Ridge National Lab., TN (USA)). Aug 1982. Contract W-7405-ENG-26. 19p. NTIS, PC A02/MF A01. Order Number DE83014058.

From US/Japan seminar on recombination induced defect formation in crystals; Urbana, IL, USA (2 Jun 1982).

Evidence is presented that H^- ions are the main electron traps responsible for the long-lived luminescence of the F centers observed at 2.3 eV in thermochemically reduced MgO crystals.

44262 (DOE/ER/04998—T2) Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel. Osenbach, J.W.; Stubican, V.S. (Pennsylvania State Univ., University Park (USA). Dept. of Materials Science and Engineering). 1982. Contract AC02-78ER04998. 24p. NTIS, PC A02/MF A01. Order Number DE83015382.

Portions are illegible in microfiche products.

The grain boundary diffusion parameter, $\alpha D'\delta$, which is the product of the segregation coefficient, the grain boundary diffusion coefficient and the boundary width has been measured in the temperature region 1200 to 1600°C along low angle and high angle grain boundaries of Al_2O_3 and $MgAl_2O_4$. The activation energies for ^{51}Cr grain boundary diffusion in Al_2O_3 and $MgAl_2O_4$ are 170 +- 10kJ/mole and 185 +- 10kJ/mole respectively, which is ~ 0.55 time the activation energy for the lattice diffusion. The grain boundary diffusivity was strongly dependent on the grain boundary orientation. The ratio of D'/sub parallel/ parallel to D'/sub perpendicular to/ perpendicular to the growth direction, D'/sub parallel to/D'/sub perpendicular to/, is ~ 23 for a 6°(0112) Al_2O_3 tilt boundary and ~ 2 for a 13°(0112) Al_2O_3 tilt boundary. The same ratio is ~ 87 for a 4.8°(100) $MgAl_2O_4$ tilt boundary and ~ 4 for a 23°(100)$MgAl_2O_4$ tilt boundary. These results indicate that the mechanism of diffusion in Al_2O_3 and $Mgal_2O_4$ grain boundaries is a dislocation pipe mechanism. It was found that the temperature dependence of the lattice diffusion coefficients of ^{51}Cr Al_2O_3 and $MgAl_2O_4$ can be expressed as: D/sub Cr/ = (2.58 +- 1.5) x 10^{-3} exp - (306 +- 58kJ/mole RT) and D/sub Cr/ = (2.45 +- 2) x 10^{-3} exp - (337 +- 45 kJ/mole/RT) cm^2/s respectively.

44263 (DOE/NE/33080—T1) Multiple-pulse laser-induced damage in crystalline and fused quartz. Final report. Bass, M. (University of Southern California, Los Angeles (USA). Center for Laser Studies). 15 Jul 1983. Contract AT03-81NE33080. 56p. NTIS, PC A05/MF A01. Order Number DE83015458.

This report presents the major results of an exhaustive study of the failure properties of crystalline and fused quartz when irradiated with many pulses of laser light at wavelengths from 1064, to 350 nm. Data is presented which shows that the bulk damage threshold for single-pulse irradiation varies little from one material to another and depends somewhat on the laser wavelength. On the other hand, the multiple-pulse damage properties are highly dependent on material, laser wavelength, spot size, pulse duration and pulse repetition rate. These results and the statistics of the multiple-pulse damage process show that it results from the accumulation of microscopic damage on each sub-catastrophic-damage threshold pulse. The repetition-rate dependence shows that the microscopic damage has a lifetime of the order of tenths of a second, and this suggests that this sort of damage may be the result of transient color-center formation.

44264 (DOE/NE/33080—T1, pp 5-38) Multiple-pulse laser-induced bulk damage in crystalline and fused quartz at 1.064 and 0.532 μm. Merkle, L.D.; Bass, M.; Swimm, R.T. (Univ. of Southern California, Los Angeles). 15 Jul 1983. NTIS, PC A05/MF A01.

In Multiple-pulse laser-induced damage in crystalline and fused quartz. Final report.

We report bulk damage measurements on single crystal quartz and two types of fused silica under single and multiple pulse laser irradiation at 1.064 μm and 0.532 μm. Whereas the single pulse damage threshold varies little among the materials or with wavelength, the multiple pulse induced damage behavior depends strongly upon material and wavelength. Laser calorimetry and measurements of light scattered during irradiation give no evidence of change prior to the pulse on which macroscopic damage occurs. However, the distribution of the number of pulses needed to produce macroscopic damage as a function of intensity is indicative of an accumulation process in which some minimum intensity is required to initiate the accumulation of microscopic damage.

44265 (DOE/NE/33080—T1, pp 39-55) Laser-induced bulk damage in SiO_2 at 1.064, 0.532 and 0.355 μm. Merkle, L.D.; Koumvakalis, N.; Bass, M. (Univ. of Southern California, Los Angeles). 15 Jul 1983. NTIS, PC A05/MF A01.

In Multiple-pulse laser-induced damage in crystalline and fused quartz. Final report.

Single- and multiple-pulse laser-induced bulk damage of fused and crystalline SiO_2 has been investigated. We studied the dependence of the intensity required to produce macroscopic damage upon wavelength, focal spot size, pulse duration, and pulse-repetition frequency. It is found that the material must undergo some undetected microscopic change prior to macroscopic damage which increases the probability of damage with increasing number of pulses. The multiple-pulse damage depends strongly on spot size, occurring in far fewer pulses at larger spot sizes than at small ones, and displays a strong dependence on pulse length and repetition frequency. Possible mechanisms are discussed.

44266 (INIS-SU—135, pp 27-28) Mechanism for damage and sputtering of non-metals by low energy ions. Baragiola, R.A. (Comision Nacional de Energia Atomica, San Carlos de Bariloche (Argentina). Centro Atomico Bariloche). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

44267 (INIS-SU—135, pp 87-89) **Investigation of the initial stages of surface erosion of solids under ion bombardment by the vacuum decoration method.** Opekunov, V.N. (AN SSSR, Moscow. Inst. Kristallografii:; Predvoditelev, A.A. (Moskovskij Gosudarstvennyj Univ. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Initial stages of the erosion development of the (100) spalling surface of NaCl monocrystals when bombarding with 20 keV Ar ions by the method of the vacuum decoration were investigated. The investigations into the erosion processes were carried out on for two cases: for a clean surface and when there are metal microparticles on the surface. The investigations have shown that the erosion process of the clean surface is developed in two stages both during normal and oblique ion incidences: gradual accumulation of surface defects resulting in the surface disintegration in the monoatomic scale and then the formation of a more coarse relief in the form of cavities which shape depends on an incident angle of ions. The investigations carried on have shown the complex nature of the erosion process. During the irradiation the gradual sputtering of metal particles takes place which stops at the irradiation doses of $2x10^{15}$ ion/cm^{-2}. Furrows form in consequence of the further irradiation at the places of gold particle location.

44268 (INIS-SU—135, pp 91-96) **Dielectric surface structure change under ion irradiation.** Tel'kovskij, V.G.; Begrambekov, L.B.; Kubyshkin, A.N. (Moskovskij Inzhenerno-Fizicheskij Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Experimental result of the melted quartz irradiation with 2-20 keV H_2^+, D_2^+, He^+ ions at 10^{18} part/cm^2 doses as well as K8 alkali glass with He^+ ions in the same energy range at doses of 10^{17}-10^{20} part/cm^2 are presented. Ion current density constituted 1-2 mA/cm^2. Specimen temperature during the irradiation was 150-200 deg C. Residual gas pressure amounted to $1x10^{-6}$-$2x10^{-6}$ mm Hg. Diameter of the target irradiated area was 4 mm. Charge on the dielectric surface was compensated with the current of ion-electron emission from metal elements of a specimen holder or from a fine grain structure grid put over the. specimen. The character of surface destructions has been investigated by an electron microscope. In consequence of the dielectric irradiation with ions observed were specimen sputtering, surface cracking under gas pressure implanted inside the target and surface destruction due to blister formation.

44269 (INIS-SU—135, pp 210-214) **Spatial distributions of energy deposited by heavy ions into nuclear collisions.** Grob, A.; Grob, J.J.; Siffert, P. (Strasbourg-1 Univ., 67 (France). Centre de Recherches Nucleaires). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The energy deposited into elastic collisions by heavy ions along their path has been determined experimentally for various ions in the energy range 20-1000 keV. Firstly, the total energy ν lost into nuclear interactions is measured by detecting the ions in a specially developped silicon counter in and off channeling conditions. Secondly, the profile of damage resulting from the bombardment of a silicon target is determined by the backscattering-channeling technique. During this second step, the implantation is performed at a very low dose and followed by an in situ analysis at 77 K. Supposing that the total area under the damage peak corresponds to the quantity ν it becomes possible to calibrate in an absolute scale (eV/A) the energy deposited in nuclear collisions along the ion path. The validity of this hypothesis is discussed and the profiles compared to theoretical models as well as to other experimental results. Furthermore, it has been established that the oscillations of the electronic stopping affects the energy deposition by nuclear interactions even for ions entering the target randomly.

44270 (INIS-SU—135, pp 219-220) **Distribution of paramagnetic centers and implanted atoms produced in Si by ^{235}U fission fragments.** Grishchenko, V.F.; Shevelev, G.A.; Gorelkinskij, Yu.V.; Botkin, V.A. (AN Kazakhskoj SSR, Alma-Ata. Inst. Fiziki Vysokikh Ehnergij:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

44271 (INIS-SU—135, pp 247-251) **Radiation-induced defects in silicon and germanium. Secondary emission investigation method.** Abroyan, I.A.; Belyakov, V.S.; Titov, A.I.; Khlebalkin, A.V. (Leningradskij Politekhnicheskij Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Radiation defects in germanium and silicon have been investigated by means of secondary emission method. Results of a series of experiments on the irradiation of a Ge monocrystal with 1-10 keV ions of Ne^+, Ar^+, Kr^+, Xe^+ inert gases are presented. Determined were a mean effective cross section of a disorded region (DR), degree of its disturbance, depth of a forming amorphous layer, amorphization dose and efficiency of introduction of stable defects. Dependences of the amorphization dose and a thickness of the amorphous layer on temperature have been investigated. Profiles of structure disturbance distributions in silicon irradiated with B^+, N^+, O^+, P^+ ions of 50-100 keV energies have been investigated as well.

44272 (INIS-SU—135, pp 271-273) **Effect of stationary force fields on the concentration and distribution of radiation damages in atom collision cascades.** Pavlov, P.V.; Morozov, N.P.; Tetel'baum, D.I.; Zorin, E.I. (Gor'kovskij Gosudarstvennyj Univ. (USSR); Gor'kovskij Gosudarstvennyj Univ. (USSR). Issledovatel'skij Fiziko-Tekhnicheskij Inst.). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Formation of a cluster of radiation defects in the presence of a force field in a solid under irradiation is considered. Evaluations of the effect of constant homogeneous force field on the concentration of the radiation defects in the cluster are given. The evaluations were made on the basis of a diffusion-coagulation model earlier suggested for silicon according to which stable presence of defects forms after irradiation due to reactions of the simplest diffusing radiation defects.

44273 (INIS-SU—135, pp 274-276) **Role of inelastic processes in displaced atom production under irradiation of materials by neutrons and charged particles.** Ibragimov, Sh.Sh.; Kozin, A.I.; Chursin, G.P. (AN Kazakhskoj SSR, Alma-Ata. Inst. Yadernoj Fiziki:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Role of inelastic mechanisms of the interaction of a bombarding particle and atom of a specimen under irradiation in radiation damages depending on energy and kinds of bombarding particles has been considered. The calculations performed have shown that with the bombarding particle energy increasing the contribution of inelastic processes to the total number of displacements formed steadily increases and becomes determining at sufficiently high energies. Besides this contribution considerably depends on the nature of the bombarding particle.

44274 (INIS-SU—135, pp 276-280) **Laser annealing of disordered regions in silicon.** Grotzschel, R.; Klabes, R.; Kreissig, U.; Rudiger, J.; Voelskow, M. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)); Krynicki, J.; Suski, J. (Institute of Nuclear Research, Warsaw (Poland)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The purpose of the paper is to compare residual lattice disorder after laser irradiation and after thermal treatment. Backscattering analysis of He^+ ions in conjunction with the channeling technique is used to investigate the disorder remaining in the silicon after ion implantation with As^+, Ga^+, In^+, Si^{++} and annealing. The effect of diffusion of the implanted atoms caused by laser irradiation is also studied.

44275 (INIS-SU—135, pp 284-286) **Formation and rearrangement of radiation defects in ion implanted semiconductors.** Dvurechenskij, A.V.; Smirnov, L.S. (AN SSSR, Novosibirsk. Inst. Fiziki Poluprovodnikov:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

In this review processes related to the amorphization of an irradiated semiconductor layer have been considered. Data on the investigation into the homogeneity of amorphous layers of germanium and silicon in a wide range of the irradiation doses (10^{15} cm^{-2} - 3x1U^{17} cm^{-2}) with Ne^+, P^+, B^+, As^+, Ar^+, H_2^+ ions of 40-50 keV are presented. Thermal and radiation structure changes in the semiconductor layers bombarded with the ions have been discussed.

44276 (INIS-SU—135, pp 287-290) **Radiation damage and implanted impurity distribution in GaAs on P ion implantation.** Belyj, I.M.; Komarov, F.F.; Tashlykov, I.S. (Belorusskij Gosudarstvennyj Univ., Minsk. Inst. Prikladnykh Fizicheskikh Problem:; Getts, G.; Shirmer, G. (Friedrich-Schiller-Universitaet, Jena (German Democratic Republic)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Main results of investigations of the defect production in gallium arsenide iimplanted with P^+ ions dependng on an integral flux and ion energy, temperature and orientation of crystals during the implantation are given. The effect of the above parameters on the distribution of implanted phosphorus has been investigated. UaAs crystals polished by a mechanical way and then by a chemical way were irradiated with P^+ ions of 30 and 60 keV and integral fluxes from 3x10^{15} to 7x10^{17} ion/cm^2 at normal temperature and during heating to 300, 350, 400 and 450 deg C. Crystals implanted were investigated by the backscattering method by means of helium ions accelerated to 1.4 MeV.

44277 (INIS-SU—135, pp 321-323) **Surface erosion of silicon carbide under helium ion bombardment.** Bondarenko, G.G.; Vasilevskij, V.V.; Ivanov, L.I.; Ivanova, L.M.; Kosterov, A.A.; Makhlin, N.A. (AN SSSR, Moscow. Inst. Metallurgii:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Surface erosion of pyrolytic silicon carbide polycrystals of cubical modification was investigated after the irradiation with 50-173 keV helium ions at doses of 1.7x10^{18} ion/cm^2 in the temperature range of 120-600 deg C. The investigation results show that a specific erosion mechanism accompanied by the transition from classical blistering (at low irradiation doses) with characteristic bulgings to multiple peeling at high irradiation doses is characteristic of silicon carbide. Use of silicon carbide as the coating for the first wall of a thermonuclear reactor is doubtful.

44278 (INIS-SU—142, pp vp) **Radiation induced defects in high dispersed silicon dioxide irradiated in the nuclear reactor at low temperatures.** Tsetskhladze, T.V.; Nadirashvili, L.Sh. (AN Gruzinskoj SSR, Tbilisi. Inst. Fiziki:. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The results of radiation of radiation-generated defects in silicon dioxide n, \-irradiated within the 20-340 K temperature range by the EPR method are presented. Formation of $Si\text{-}O^-$-type centres on the surface and nonparamagnetic E''-centres in the sample volume is presupposed on the base of the experimental data obtained on the samples with different specific surfaces. Competition for neutron capture between the Si-O type defects and E'-centres resulting in formation of non-paramagnetic varieties of electron centres is stated to take place during silicon dioxide radiation. Threshold value of the integral flux by thermal neutrons (10^{17} neutrxcm^{-2}) causing damage of ordened regions in globulars of silicon dioxide is stated by investigating the form of the line in the EPR spectrum. Silicon dioxide radiation in gas atmosphere with essential similarity to electron results in the E'' centre damage.

44279 (INIS-SU—147, pp vp) **Relation between the conditions of helium ion implantation and helium void equilibrium parameters.** Neklyudov, I.M.; Rybalko, V.F.; Ruzhitskij, V.V.; Tolstolutskaya, G.D. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The conditions of helium thermodynamic equilibrium in a system of voids produced by helium ion bombardment of a metal sample are studied. As an initial equation for description of the equilibrium the Clapeyron equation was used. The equation is obtained relating basic parameters of helium voids (average diameter and density) to irradiation parameters (dose, ion energy (straggling)) and properties of the metal (surface tension coefficient, yield strength). Comparison of the calculations with experimental data on helium in nickel found in literature shows that the equation yields satisfactory resutls for the dose range 1.10^{16}-1x10^{17} cm^{-2} and temperatures T < or approximately 1100 K. Divergence from experiment does not exceed approximately 30%.

44280 **(INIS-SU—147) Radiation damage physics and radiation technology.** (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1981. 107p. (In Russian). (CONF-810293—No.5). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780874.

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Abstracts of individual items from the conference were prepared separately for the data base. (GHT)

44281 **(LBL—14938) Electrical properties of glassy carbon.** Baker, D.F.; Bragg, R.H. (Lawrence Berkeley Lab., CA (USA)). Sep 1982. Contract AC03-76SF00098. 7p. (CONF-8211103—1-Abst.). NTIS, PC A02/MF A01. Order Number DE83015283.

From International symposium on carbon; Toyohashi, Japan (1 Nov 1982).

The electrical conductivity, Hall effect, and magnetoresistance of glassy carbon were measured after heat treatments (HTT) at 1000 to 3000°C and in magnetic fields up to 5 Tesla. The conductivity is the sum of three components and follows the equation σ = A + B exp - CT/sup -1/4/ + δ T. Results indicate there are microstructural changes occurring with HTT. 3 figures. (DLC)

44282 **(LBL—16190) Influence of oxygen on segregation of chromium at structural damage in gallium arsenide.** Zee, T.I.S.Y. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 52p. NTIS, PC A04/MF A01. Order Number DE83014901.

Thesis.

Cr redistribution in presence of dislocations and 0 atoms in ion-implanted and furnace-annealed GaAs was studied by XTEM and SIMS. Cr-doped, semi-insulating (100) GaAs samples were self-

implanted with 550-keV Ga and As ions at RT. Two different doses ($4x10^{15}$ cm^{-2} and $2x10^{15}$ cm^{-2}) of 0 were also implanted after the above implantation. Initial implantation damage in samples with or without oxygen consisted of continuous bands of amorphous and microtwinned material, respectively. Comparison of the TEM results from annealed samples (600 to 840°C) with and without 0 showed that highly twinned and misoriented GaAs forms along with a network of densely entangled dislocations near the surface (O-R/sub p/) in the former case while only entangled dislocations by plastic deformation occur over the depth range O-R/sub p/ in the latter case. The deeper parts in both cases contained bands of dislocation loops, whose diameter became smaller with increasing amount of 0. SIMS showed redistribution of Cr and 0 in the implanted region and vicinity. In the samples without 0, there was a one-to-one correspondence between the positions of the damage layers and peaks in the atomic profile of Cr. However, in the presence of 0, such correlations became complicated. A model explaining the Cr redistribution in amorphous GaAs and Cr segregation to the defects is presented. The pronounced effect of 0 on Cr redistribution and retardation in the annealing out of dislocations has been explained by the formation of Cr-0 complexes during the annealing and their interaction with dislocations.

44283 **(LBL—16272) High-resolution electron-microscopy studies of native oxide on silicon.** Mazur, J.H.; Gronsky, R.; Washburn, J. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 19p. NTIS, PC A02/MF A01. Order Number DE83014794.

High-resolution electron microscopy (HREM) of cross-sectional specimens has shown that the thickness of the native oxide on silicon is 20 +- 3A, independent of surface orientation. This result has confirmed the value 21 +- 4A determined by ellipsometry assuming a stoichiometric SiO_2 native oxide. Previous reports of a nonstoichiometric transition layer between Si and SiO_2 containing an excess of 10^{15} cm^{-2} Si atoms have also been alternatively explained by the observed morphological features of the Si-SiO_2 interface.

44284 **(SAND—83-0697C) Nonhydrostatic effects in stress-wave induced phase transformation of calcite.** Grady, D.E. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 3p. (CONF-830719—2). NTIS, PC A02/MF A01. Order Number DE83014611.

From Topical conference on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

Displacive phase transformation occurs readily under stress-wave loading and is dependent on the nonhydrostatic stress state. Both static and stress-wave data for phase transformation in calcite rock are compared for shear stress dependence. A nonhydrostatic thrmodynamic theory has been developed. Through the theory, nonhydrostatic relations of phase equilibria are obtained which constrain the volume and shape change through the transformation. The theory is applied to the stress-induced displacive calcite I-II phase change in Oakhall limestone.

44285 **(SAND—83-1300C) Theory of dephasing of impurities in glasses.** Lyo, S.K. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 13p. (CONF-830677—1). NTIS, PC A02/MF A01. Order Number DE83015105.

From Conference on electronic excitations and interaction processes in organic molecular aggregates; Schlafs Elmau, F.R. Germany (5 Jun 1983).

The homogeneous optical linewidth arising from impurity-TLS interaction is examined for resonant optical transitions in glasses. A rigorous Green's function approach and a simpler and more intuitive method are found to yield the same result. The width is due to modulation of the optical levels caused by coupling to the diagonal as well as off-diagonal elements of TLS. The main contribution arises from diagonal modulation at low temperatures. In this case a perturbation theory is shown to be inadequate. For diagonal modulation the contribution to the linewidth from a typical weakly coupled (but with vertical bar V/sup z/ vertical bar > K tau^{-1}) TLS is larger than that of a strongly coupled TLS and is independent of the coupling strength to the ion: it equals twice the thermal average of the two level-widths of the TLS. Therefore the total linewidth arises dominantly from these abundant but weakly coupled TLS. For a flat density of states of TLS the low temperature linewidth is proportional to T, $T^{1.75}$ and $T^{2.3}$, respectively, for a dipole-dipole, dipole-quadrupole and quadrupole-quadrupole coupling. The result is compared with recent data. Other mechanisms such as local vibrational and librational modes are also expected to contribute to the linewidth at higher temperatures.

44286 **EXAFS study of bromomanganate ions in molten salts.** Crozier, E.D.; Alberding, N.; Sundheim, B.R. (Physics Department, Simon Fraser University, Burnaby, British Columbia V5A 1S6). *Journal of Chemical Physics;* **79**: No. 2, 939-943(15 Jul 1983).

Extended x-ray absorption fine structure spectra measurements were made on molten $(Bu_4N)MnBr_3$ to determine its coordination geometry which has remained in doubt because of its disproportionated structure in the solid form. Comparison with results on solid and molten $(Bu_4N)_2MnBr_4$ imply a Br to Mn coordination in $(Bu_4N)MnBr_3$ of 3.14 +- 0.36 at an average distance of 2.46 +- 0.03 A. It is concluded that the nominal $MnBr_3$ moiety is, in fact, trigonal: a species previously unknown in liquids. The EXAFS of $(Bu_4N)_2MnBr_4$ give a Br—Mn bond length of 2.50 +- 0.02 A when small corrections for an asymmetric pair distribution are included. The variation of the disorder parameter with temperature is in accord with measured asymmetric stretch frequencies of the MnBr/sup anion. No abrupt change in the disorder parameter of bond length occurs at the melting point. The near edge absorption spectra of both compounds are unexpectedly similar considering the difference in coordination numbers.

44287 **Intrinsic defects in ZnO varistors.** Mahan, G.D. (Corporate Research and Development, General Electric Company, Schenectady, New York 12301). *Journal of Applied Physics;* **54**: No. 7, 3825-3832(Jul 1983). Contract W-7405-ENG-26.

Theoretical calculations are presented for equilibrium concentrations of zinc and oxygen vacancies in ZnO. Results are presented at the sintering temperature, and also at room temperature. Theoretical calculations of reaction constants show that the intrinsic donor is the oxygen vacancy, rather than the zinc interstitial. The depletion of vacancies in the surface region, as the ZnO is cooled from the sintering temperature, is also calculated. Homojunction effects which are caused by such depletion are shown to be small.

44288 **Mass spectrometric studies of impurities in silane and their effects on the electronic properties of hydrogenated amorphous silicon.** Corderman, R.R.; Vanier, P.E. (Division of Metallurgy and Materials Science, Brookhaven National Laboratory, Upton, New York 11973). *Journal of Applied Physics;* **54**: No. 7, 3987-3992(Jul 1983).

The concentration of volatile impurities in silane (SiH_4) and disilane (Si_2H_6) used to prepare hydrogenated amorphous silicon (a-Si:H) thin films by glow-discharge deposition has been measured by modulated molecular beam mass spectrometry with a sensitivity of 1 ppm. From dark conductivity measurements on these films the location of the Fermi energy E/sub F/ was determined. The Fermi levels of a-Si:H films were progressively lower with increasing concentrations of chlorine-containing molecules (mostly HCl and SiH_3Cl) in the silane, indicating that these species can act as weak p-type dopants in a-Si:H. Oxygen-containing species (mostly SiH_3OSiH_3) were also detected in silane. It is clear from these results that large variations in electronic properties of glow discharge a-Si:H can be attributed to differences in purity of silane used in the deposition.

44289 **Grain boundary phenomena in n-type CdTe films grown by hot wall vacuum evaporation.** Huber, W.; Fahrenbruch, A.L.; Fortmann, C.; Bube, R.H. (Department of Materials Science and Engineering, Stanford University, Stanford, California 94305). *Journal of Applied Physics;* **54**: No. 7, 4038-4043(Jul 1983).

Films of n-type CdTe doped by coevaporation of indium have been deposited by hot wall vacuum evaporation on 7059 Corning glass and BaF_2 single crystal substrates. Layers deposited on glass show a dark resistivity of the order of 10^5 Ω cm and a light

resistivity of 500 Ω cm under AM1.5; photoexcitation increases the electron density but does not affect the electron mobility. Layers deposited on BaF_2 show a dark resistivity of about 3 Ω cm and a light resistivity of about 2 Ω cm, corresponding to an electron density of 3.9 x 10^{16} cm^{-3} and an electron mobility of 48 cm^2/V s; illumination of these layers on BaF_2 increases the electron mobility but not the electron density. A quantitative model for grain boundary transport in polycrystalline materials is shown to give good agreement with the experimental data.

44290 **Detection of traps in high conductivity ZnSe by optical transient capacitance spectroscopy.** Christianson, K.A.; Wessels, B.W. (Department of Materials Science and Engineering, Northwestern University, Evanston, Illinois 60201). *Journal of Applied Physics;* **54**: No. 7, 4205-4208(Jul 1983). Contract AC02-79ER10390.

Deep level defects in high-conductivity ZnSe have been observed with optical deep level transient spectroscopy. An electron trap and hole trap with energy levels at E/sub c/ -0.33 and E/sub v/ +0.71 eV, respectively, were detected in the as-grown material. Trap concentrations were in the range of 0.4—2.0 x 10^{16} cm^{-3}. For zinc annealed samples, a trap at E/sub v/ +0.21 eV was also observed in concentrations as high as 9 x 10^{15} cm^{-3}. The chemical identity of the hole traps remain undetermined, but experimental evidence indicates they may involve native defects.

44291 **Intrinsic interface states as extended deep traps: Ge/GaP and Si/GaP.** Buisson, J.P.; Kykta, M.P.; Dow, J.D.; Beres, R.P.; Allen, R.E. (Department of Physics and Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801). *Journal of Applied Physics;* **54**: No. 7, 4221-4222(Jul 1983). Contract AC02-76ER01198.

Electronic interface state dispersion curves E(k-bar) are predicted for (110) Ge/GaP and Si/GaP interfaces, and are found to overlap the mutual fundamental band gaps. Such bound interface states can act as extended deep traps.

44292 **Optical functions of silicon between 1.7 and 4.7 eV at elevated temperatures.** Jellison, G.E. Jr.; Modine, F.A. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review [Section] B: Condensed Matter;* **27**: No. 12, 7466-7472(15 Jun 1983).

Polarization modulation ellipsometry has been used to determine the optical functions of silicon at elevated temperatures up to 1000 K. The E_1, E_0/sup prime/, and E_2 features move monotonically to lower energies as the temperature is increased. A fit of the E_0/sup prime/ and E_2 peak positions to the empirical formulation of Varshni is obtained; it is found that the critical points of the joint density of states for the E_0/sup prime/ and E_2 gaps move somewhat differently from the indirect gap, although the difference is not large.

44293 **Critical behavior of a site-diluted three-dimensional Ising magnet.** Birgeneau, R.J.; Cowley, R.A.; Shirane, G.; Yoshizawa, A.H.; Belanger, D.P.; King, A.R.; Jaccarino, V. (Brookhaven National Laboratory, Upton, New York 11978). *Physical Review [Section] B: Condensed Matter;* **27**: No. 11, 6747-6753(1 Jun 1983).

The critical behavior of the site-diluted three-dimensional Ising antiferromagnet Fe/sub 1-x/Zn/sub x/F_2 has been studied with the use of neutron scattering and linear birefringence techniques. The neutron scattering measurements were performed on a crystal with x≅0.5 and T/sub N/ = 42.50 K. The critical scattering has a Lorentzian profile both above and below T/sub N/. The staggered susceptibility and correlation length exhibit power-law divergences over the reduced-temperature range 10^{-1} to 2 x 10^{-3} with critical exponents $\gamma = \gamma' = 1.44 \pm 0.06$ and $\nu = \nu' = 0.73 \pm 0.03$, respectively. From the linear birefringence Δn, the critical behavior of the magnetic heat capacity was determined on a crystal with x = 0.4 and T/sub N/ = 47.05 K. d(Δn)/dT clearly exhibits cusplike behavior rather than a power-law divergence over the reduced-temperature range 2 x 10^{-2} to 10^{-3} with exponent $\alpha = \alpha' = -0.09 \pm 0.03$. The correlation-length and heat-capacity critical indices satisfy the hyperscaling relation $3\nu+\alpha-2 = 0$ to within the experimental errors. Since all measured exponents differ markedly from the pure Ising values, this strongly suggests that random-exchange Ising behavior has been observed. The results are consistent with recent theoretical predictions for the random-exchange Ising fixed point by Newman and Riedel.

44294 **Isotope dependence of the breakdown strength of gases.** Christophorou, L.G.; Mathis, R.A.; James, D.R. (Atomic, Molecular and High Voltage Physics Group, Health and Safety Research Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Journal of Applied Physics;* **54**: No. 6, 3098-3100(Jun 1983). Contract W-7405-ENG-26.

It has been found that while the highly nonuniform direct current breakdown voltage V/sub s/ of H_2 exceeds that of D_2, the V/sub s/ of CH_4 is substantially lower than that of CD_4. The former (direct) and the latter (inverse) isotope effects are discussed, respectively, in connection with differences in the ionization coefficients and electron-impact-induced dissociation processes of the isotopic pairs of molecules.

44295 **Dielectric relaxation in insulators slightly damaged by stress pulses.** Lysne, P.C. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **54**: No. 6, 3160-3165(Jun 1983). Contract AC04-76DP00789.

The relationship between incipient stress-pulse-induced damage and the electrical response of a piezoelectric, ferroelectric, or electrically biased dielectric is examined. The model assumes the presence of isolated inclusions of damaged material which are conducting and which may grow. Virgin insulating material surrounds the inclusion . Sillars' model of an inhomogeneous dielectric is invoked to yield parameters of an electrically equivalent, relaxing dielectric. These parameters are used to generate the electrical response caused by propagating stress pulses. Qualitative agreement with current histories obtained from experiments on X-cut quartz is obtained, quantitative results await further experimentation.

44296 **Theory of bulk gettering.** Knize, R.J.; Cecchi, J.L. (Princeton University, Plasma Physics Laboratory, Princeton, New Jersey 08544). *Journal of Applied Physics;* **54**: No. 6, 3183-3189(Jun 1983). Contract AC02-76CH03073.

A theory describing bulk better operation is presented. The theory is applicable to a diatomic gas which adsorbs dissociatively on a getter material which exhibits a time independent sticking coefficient. The theory includes the effects of surface reactions and bulk diffusion. Exact numerical solutions are presented for the particular cases of pumping and desorption. In addition, approximate analytical solutions are derived and used to illustrate the characteristics of the particular operational regimes. The theory is applied to the analysis of the pumping and desorption behavior of the Zr-Al alloy bulk getter. The predictions of the theory are in excellent agreement with the experimentally measured Zr-Al performance.

44297 **Pressure induced conduction and valence band shifts in InP and GaAs from measurements at semiconductor—electrolyte interfaces.** Zurawsky, W.P.; Littman, J.E.; Drickamer, H.G. (School of Chemical Sciences and Materials Research Laboratory, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801). *Journal of Applied Physics;* **54**: No. 6, 3216-3219(Jun 1983). Contract AC02-76ER01198.

The effect of pressure on the band gap and flatband potential of n- and p-type InP and GaAs was studied to 10 kbar at 300 K. For both InP and GaAs it was determined that the increase of the energy gap of the direct transition is to first order due to an increase in energy of the conduction band edge.

44298 **Carrier multiplication in semiconductors induced by the absorption of high-intensity CO_2 laser light.** James, R.B. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee). *Journal of Applied Physics;* **54**: No. 6, 3220-3235(Jun 1983). Contract W-7405-ENG-26.

A calculation is presented to describe the modification of the carrier distribution due to the presence of high-intensity CO_2 laser radiation for several semiconductors. In the calculation the intercar-

rier collision rates are assumed to be sufficiently large that the distribution can be described by a carrier temperature, which may be much larger than the lattice temperature. The steady-state carrier temperature is calculated as a function of the light intensity by equating the rate of energy which the carriers receive from the electromagnetic field and the rate of energy which the carriers lose to the lattice by the emission of phonons. For sufficiently high light intensities, a significant fraction of the total free carrier density can have kinetic energies which exceed the band gap. These hot carriers are energetically capable of relaxing by undergoing an inelastic pair-producing scattering event. This impact ionization process can lead to the formation of a laser-induced plasma by the absorption of light well below the band gap of the material. Explicit values are presented for the intensity thresholds at which the impact ionization process becomes important for light in the 9—11 μm region. Comparison of the results with transmission measurements indicate that this mechanism may be responsible for the nonlinear absorption observed in several semiconductors by high-intensity pulsed CO_2 laser light.

44299 **Substitutional placement of phosphorus in ion implanted silicon by recrystallizing amorphous/crystalline interface.** Sadana, D.K.; Washburn, J.; Magee, C.W. (Lawrence Berkeley Laboratory and Department of Materials Science and Mineral Engineering, University of California, Berkeley, California 94720). *Journal of Applied Physics;* **54**: No. 6, 3479-3484(Jun 1983). Contract AC03-76SF00098.

Ion implantation of P into (111) Si has been investigated by cross-sectional transmission electron microscopy and secondary ion mass spectrometry. In the dose range 1×10^{15}—2×10^{16} cm^{-2} at 120 keV the formation and width of the amorphous (a) layers were sensitively dependent on wafer temperature. The effect of dynamic annealing on the crystalline (c) to amorphous transformation, and the effect of amorphicity and roughness of the a/c interface on the formation of microtwins have been studied. It has been observed that the P atoms in the amorphous (a) region do not redistribute on subsequent annealing while the P atoms below the a/crystalline (c) interface diffuse rapidly into the Si substrate. The carrier concentration profiles from the annealed samples were found to follow the atomic profiles almost exactly over the depth range extending from the surface to where the original a/c interface existed. However, in the deeper regions, the electrical activity was found to be dependent on the annealing temperature used. The different behavior of atomic and carrier concentration redistributions in the amorphous and crystalline regions has been explained by a model that assumes incorporation of impurity atoms on substitutional sites by the moving a/c interface on recrystallization. The P atoms in the deeper regions are believed to redistribute via an interstitial diffusion mechanism at low temperatures ($<$ or $=$750 °C) and eventually occupy substitutional sites at higher temperatures ($>$800 °C).

44300 **Refractive index of quaternary In/sub 1-x/Ga/sub x/As/sub y/P/sub 1-y/ lattice matched to InP.** Jensen, B.; Torabi, A. (Department of Physics, Boston University, Boston, Massachusetts, 02215). *Journal of Applied Physics;* **54**: No. 6, 3623-3625(Jun 1983). Contract AC02-79ER10444.

The refractive index of the quaternary InGaAsP lattice matched to InP at energies below the fundamental absorption is presented. The theoretical result for refractive index n is obtained from a quantum mechanical calculation of the dielectric constant of a compound semiconductor. It is given in terms of basic material parameters only, with no adjustable constants. Comparison of theory with experimental data is also discussed.

44301 **Brillouin scattering from H_2O: Liquid, ice VI, and ice VII.** Polian, A.; Grimsditch, M. (Laboratoire de Physique des Milieux Tres Condenses, Universite Pierre et Marie Curie, 4 Place Jussieu, F-75230 Paris Cedex 05, France). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 10, 6409-6412(15 May 1983).

Brillouin scattering from H_2O under hydrostatic pressures up to 30 GPa is reported. Sound velocities in the liquid region agree with previous ultrasonic measurements and discontinuities are observed at the liquid—ice VI and ice VI—ice VII phase transitions. Elastic moduli derived from the frequency shifts are compared with bulk modulus values obtained from compressibility data.

44302 **Energy dependence of the carrier mobility-lifetime product in hydrogenated amorphous silicon.** Jackson, W.B.; Nemanich, R.J.; Amer, N.M. (Xerox Palo Alto Research Center, 3333 Coyote Hill Road, Palo Alto, California 94304). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 8, 4861-4871(15 Apr 1983).

The results of optical-absorption measurements determined by photothermal deflection spectroscopy, primary photoconductivity, and secondary photoconductivity on undoped and phosphorus-doped hydrogenated amorphous silicon films (a-Si:H) are reported. A normalization procedure for obtaining photocurrent spectra at constant generation rate is demonstrated. From these measurements, the efficiency-mobility-lifetime product (etaμtau) for electrons is found to be constant from 2.0 to ~0.9 eV for both undoped and phosphorus-doped a-Si:H. For excitations less than ~0.9 eV, there is evidence that the product etaμtau for electrons drops rapidly; similarly, the etaμtau for holes exhibits a rapid decrease in undoped material for photon energies less than ~1.5 eV. A model is proposed to explain the results, resolving a discrepancy between secondary- and primary-photoconductivity measurements of the optical absorption.

44303 **Effective spherical potentials for molecular fluid thermodynamics.** Shaw, M.S.; Johnson, J.D.; Holian, B.L. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **50**: No. 15, 1141-1144(11 Apr 1983).

Through a thermodynamic perturbation expansion, a new sphericalization procedure has been obtained for anisotropic molecular potentials. For N_2 the resulting fluid pressures and internal energies for the effective spherical potential differ at high densities by at most 1.5% from exact molecular-dynamics calculations for the anisotropic N_2 potential. Results at lower densities are comparably good. Preliminary results for CO_2, an even more anisotropic molecule, are also excellent.

44304 **Reemitted-positron energy-loss spectroscopy: A novel probe of adsorbate vibrational levels.** Fischer, D.A.; Lynn, K.G.; Frieze, W.E. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review Letters;* **50**: No. 15, 1149-1152(11 Apr 1983). Contract AC02-76CH00016.

Vibrational excitations of carbon monoxide on Ni(100) have been observed for the first time in the energy-loss spectrum of reemitted positrons. For Ni(100)c(2 x 2)CO at room temperature energy-loss peaks are found at ~57 and ~248 meV, corresponding to Ni-C and C-O stretching vibrations, respectively. These peak positions are in good agreement with previously reported results for electron energy-loss spectroscopy. Anticipated improvements in resolution promise to make reemitted-positron energy-loss spectroscopy competitive with high-resolution electron energy-loss spectroscopy.

44305 **Valence-electron density in silicon under high pressure.** Yin, M.T.; Cohen, M.L. (Bell Laboratories, Murray Hill, New Jersey 07974). *Physical Review Letters;* **50**: No. 15, 1172(11 Apr 1983).

A Comment on the Letter by P. R. Yoder-Short, R. Colella, and B. A. Weinstein, Phys. Rev. Lett. 49, 1438 (1982).

44306 **Distance dependence of electronic energy transfer to semiconductor surfaces: $^3n\pi$ /sup / pyrazine/GaAs(110).** Whitmore, P.M.; Alivisatos, A.P.; Harris, C.B. (Department of Chemistry and Materials and Molecular Research, Division of Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Physical Review Letters;* **50**: No. 14, 1092-1094(4 Apr 1983). Contract AC03-76SF00098.

Energy transfer from $^3n\pi^*$ pyrazine to GaAs(110) has been studied. Within experimental error, a classical dielectric model quantitatively reproduces measurements of the distance-dependent lifetime for emitter-surface separations from 430 to 20 A. Analysis of the energy transfer shows that the molecular electronic excitation is dissipated through the creation of electron-hole pairs in the

solid by the high—wave-vector components of the dipole near field.

44307 **Double electron-muon resonance experiments on muonium in quartz.** Brown, J.A.; Heffner, R.H.; Leon, M.; Dodds, S.A.; Estle, T.L.; Vanderwater, D.A. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 7, 3980-3986(1 Apr 1983).

Double electron-muon resonance experiments on muonium in quartz are described. The observed muon-spin—rotation spectra show a structure resulting from the coherent response of the system to the radio-frequency magnetic field. The theory of this structure is developed and agreement with experiment is within experimental error.

44308 **Physical content of electron-charge-density distributions in A15 compounds.** Staudenmann, J.; DeFacio, B.; Stassis, C. (Ames Laboratory and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 7, 4186-4209(1 Apr 1983).

The starting point of the present article is a careful analysis of the physical meaning of the three deformation electron-charge-density maps for V_3Si, V_3Ge, and Cr_3Si [previously presented by J.-L. Staudenmann et al., Phys. Rev. B 24, 6446 (1981)]. Based on the significant differences exhibited in these maps, it was shown that one can organize all the Debye temperatures at 0 K from specific-heat measurements into five collections which were called Debye classes. The findings here presented are not limited to A15 alloys alone, but rather can be applied to any other family of compounds that satisfies the free-atom superposition principle and the small-amplitude vibration hypothesis. It is shown that deformation electron charge densities depend only weakly upon structure and that they are mainly related to physical properties. Furthermore, the use of deformation electron-charge density as a criterion in setting the starting point for the three main Debye classes is justified a posteriori. We point out that when one takes into account the consequences of the dielectric function, the static or bonding electron charge density can only be extracted with great difficulty from any experimental data. This certainly complicates any comparison between experimental and computed electron charge densities. It is shown that the deformation and total electron charge densities are the only well-defined inverse fourier transforms. If the vibration amplitude of the valence-electron orbitals are non-negligible, the valence-electron charge density, in contrast to the deformation and total electron charge densities, has no simple interpretation.

44309 **Magnetism and crystalline electric fields in $R_2Fe_3Si_5$ compounds/sup /.** Noakes, D.R.; Shenoy, G.K.; Niarchos, D.; Umarji, A.M.; Aldred, A.T. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 7, 4317-4324(1 Apr 1983). Contract W-31-109-ENG-38.

Results of magnetization, ^{57}Fe, ^{155}Gd, and ^{166}Er Moessbauer-effect measurements on $Gd_2Fe_3Si_5$ and $Er_2Fe_3Si_5$ are presented. There is no magnetic moment on Fe. The Gd Moessbauer results are used to construct an approximate model of the crystalline—electric-field effects in the heavy rare-earth members of the $R_2Fe_3Si_5$ family. This model predicts large magnetic anisotropy in these materials, explains the well-developed static hyperfine interaction seen in the Er resonance spectra up to 4.2 K, and overestimates the deviations from de Gennes—law scaling in the magnetic transition temperature.

44310 **Low-temperature heat capacity of superconducting ternary iron silicides.** Vining, C.B.; Shelton, R.N.; Braun, H.F.; Pelizzone, M. (Ames Laboratory and Department of Physics, Iowa State University, Ames, Iowa 50011). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 5, 2800-2806(1 Mar 1983). Contract W-7405-ENG-82.

The low-temperature heat capacity of superconducting ternary iron silicides $Lu_2Fe_3Si_5$, $Sc_2Fe_3Si_5$, and $Y_2Fe_3Si_5$ has been measured, revealing several anomalous properties of the superconducting state of these materials. These materials show a large linear term in the superconducting heat capacity and a reduced normalized jump in the specific heat at T/sub c/. A two-band model is proposed to explain these properties and previously reported anomalous properties of superconducting ternary iron silicides.

44311 **Melting of pseudopotential sodium from molecular dynamics.** Holian, B.L.; Straub, G.K.; Swanson, R.E.; Wallace, D.C. (Los Alamos National Laboratory, Los Alamos, New Mexico, 87545). *Physical Review* [*Section*] *B: Condensed Matter;* **27**: No. 5, 2873-2876(1 Mar 1983).

For a pseudopotential model of metallic sodium, the Gibbs free energy of the fluid phase was calculated by a combination of molecular dynamics and the high-temperature free-energy expansion. From these calculations, together with previous molecular-dynamics results for crystalline sodium, the melting transition was determined as a function of pressure, up to 16 kbar. The pressure-temperature phase line is in good agreement with experiment, and so are the changes associated with melting at zero pressure, namely the heat of fusion, the entropy of fusion, and the relative volume change. The dynamic melting process, previously observed in molecular-dynamics simulations of sodium, is also in good agreement with the present equilibrium calculations.

44312 **Photoacoustic and absorption spectra of UF_4.** Hodul, D.T. (Received 22 November 1982; accepted 22 December 1982). *Spectroscopy Letters;* **16**: No. 3, 181-191(Mar 1983). Contract W-31-109-ENG-38.

The photoacoustic spectra of UF_4 was measured at cryogenic and room temperatures. The wavelength range studied was 800—2600 nm. (AIP)

44313 **Visible and ultraviolet absorption spectrum of UCl_5 dissolved in liquid Xe.** Maier, W.B.; Holland, R.F.; Beattie, W.H. (University of California, Los Alamos National Laboratory, Los Alamos, NM 87545). *Spectroscopy Letters;* **16**: No. 3, 233-238(Mar 1983).

The visible and ultraviolet absorption spectrum of UCl_5 dissolved in liquid xenon is measured. Some structure is observed, and the absorption extend into the red.

44314 **Defect reactions and effects of coimplants and prior heat treatment in pulsed laser annealing of ion-implanted CdTe:In and CdTe:Cl.** Norris, C.B.; Peercy, P.S. (Sandia National Labs., Albuquerque, NM (USA)). *Radiation Effects;* **69**: No. 3-4, 267-275(Feb 1983).

Depth-resolved cathodoluminescence at 80 K was used to investigate the effects of substrate impurities, Cd or Te coimplants, and Cd-vapor prefiring treatments on the defect reactions that occur in pulsed laser annealing of shallow implants in CdTe (Cs^+ in CdTe:In, As^+ in CdTe:Cl). Implantation into either substrate produces strong nonradiative (<1 eV) defect introduction in the ion range zone (calculated Rsub(p) = 300 to 440 A). Less severe defect introduction proceeds further to depths on the order of 1 μm into the postrange zone. Pulsed (20ns) ruby laser annealing was performed at energy densities of 0.16 to 0.32 J/cm^2, with calculated melting depths estimated to be <= 400 A. The results, which are presented and discussed, indicate that prior Cd-vapor heat treatment can influence the annealing-related defect reactions in CdTe:Cl and significantly improve both the range zone and postrange luminescence recovery under pulsed laser annealing.

44315 **Permanent damage effects in Si and AlGaAs/GaAs photodiodes.** Wiczer, J.J.; Barnes, C.E.; Dawson, L.R.; Osbourn, G.C. (Sandia Nat'l Labs., Albuquerque, NM 87185). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **25**: No. 6, 1535-1544(Dec 1982).

The authors report here on a study of permanent damage effects in photodiodes due to total dose exposures of 10^9 rad (Si) ionizing-radiation from a Co^{60} source. Specifically, the authors compare the degradation of optical quantum efficiency and increases in photodiode leakage current in Si PIN structures with specially designed and fabricated, double heterostructure AlGaAs/GaAs photodiodes. Results indicate some degradation in quantum efficiency (20-30%) for both types of devices. Leakage currents were found to

increase significantly after 10^8 rad in the Si PIN structures but only increase slightly in the AlGaAs/GaAs structures.

44316 **Kinetics of aggregation and annealing of defects in heavily X-irradiated alkali chloride crystals studied by positron annihilation.** Stern, S.; Brandt, W. (New York Univ., NY (USA). Radiation and Solid State Lab.). pp 629-631 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Using the positron as a microscopic probe, the authors have measured rates and activation energies for the kinetics of F-center aggregation and anneal in single crystals of NaCl, KCl, RbCl, and CsCl. The crystals were colored to F-center concentrations of approximately 10^{16} cm^{-3} by X-rays of average energy 11 keV at a dose rate approximately 5 Mrad/h at 20°C to a total dose of 80 Mrad. Isothermal and isochronal measurements were performed in a π-radian coincidence apparatus (PICA) for recording the two 0.5 MeV positron-electron annihilation γ rays emerging from the crystals.

44317 **Positron lifetime spectra of annealed argon matrices.** Schrader, D.M.; Loewenschuss, A.; Jean, J.Y.; Nakamoto, K.; Pollard, B.D. (Marquette Univ., Milwaukee, WI (USA). Dept. of Chemistry). pp 657-659 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Solid argon matrices are prepared by rapidly condensing the gas from a jet onto a cold (11.4 K) surface. The resulting voids are studied by means of positron lifetime spectroscopy under conditions of isochronal annealing up to 50 K. The data are interpreted in terms of early trapping of positrons in the voids followed by a rapid reaction with secondary electrons which results either in annihilation or positronium formation. Positronium is also bound in the voids and exhibits a long lifetime, suggesting an effective diameter of about 4.7 A in the unannealed samples.

44318 **Concerning the trapping of positrons in ionic solids.** Kunz, A.B. (Illinois Univ., Champaign (USA). Physics Dept.); Waber, J.T. (Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering). pp 682-684 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

The total energy of several ionic crystals which contain lattice defects plus a positron were studied in the Hartree-Fock limit. Large uncontracted basis sets of GTO's were used to ensure binding if it would occur. Specifically, the attraction of a positron to a cation vacancy was sought for alkali halides as well as for nickel oxide. While the binding energy to nickel oxide was 8.1 eV, there was very little tendency for the positron to be trapped in the alkali halides. The trapping at a Vsub(k) site was also investigated using similar restricted HF approximation with large sets of GTO's. This defect in LiF was shown to be stable by 0.73 eV, by itself but was unable to bind a positron. These two results are not compatible with qPs being localized in such crystals.

44319 **Phase transformation study of n-hexadecanol by positron annihilation.** Walker, W.W. (Alabama Univ., University (USA)). pp 727-729 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Positron lifetimes have been measured as a function of temperature in n-hexadecanol (cetyl alcohol). This fatty alcohol is known from X-ray diffraction experiments to have at least three crystal forms: α (hexagonal), β (orthorhombic), and γ (monoclinic). Both the β and γ forms are stable at temperatures well below the melting point while α is a waxy phase stable for only a few degrees below the melting point. It was found that positron lifetime parameters, using a three-component analysis, differ only slightly for the β and γ phases, with little temperature dependence, while a strong temperature dependence was observed for the α phase.

44320 **Detection of phase transitions in $NaNO_3$ crystals by positron annihilation.** Chuang, S.Y.; Ottlinger, M.E.; Diana, L.M.; Coleman, P.G.; Sharma, S.C.; Smith, J.H. (Texas Univ., Arlington (USA). Center for Positron Studies). pp 732-733 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Lifetime spectra of positron annihilation in polycrystalline $NaNO_3$ powders have been measured as a function of temperature from 200 K to 566 K. All lifetime spectra were decomposed into two lifetime components, a short lifetime component with meanlife tau_1 ranged from 250 psec to 290 psec and a long lifetime tau_2 approximately 1.2 nsec and a small intensity I_2 approximately 0.5%. It was found that tau_1 undergoes a drastic change at about 548 K which may be attributed to the onset of disordered vibration-rotation of the nitrate group in $NaNO_3$. It was also observed that a small change in tau_1 occurred at about 250 K approximately 270 K which seems to confirm the new phase transition observed by X-ray studies.

44321 **Search for the charge density wave in solids by positrons: a 2H-$TaSe_2$ crystal.** Jean, Y.C. (Missouri Univ., Kansas City (USA)). pp 739-741 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

An attempt to detect the Charge-Density-Wave (CDW) phase transitions has been made in an annealed 2H-TaSe crystal by the positron lifetime method. The positron lifetimes of this crystal were carefully measured as a function of temperature between 10 and 498 K. Two distinct and constant lifetimes, i.e. 0.130 +- 0.007 and 0.378 +- 0.008 nsec, were found in the temperature range between 10 K and 300 K. These two lifetimes are thought to be due to the anisotropic character of the two-dimensional layered structure of the crystal. Positrons appear too localized to detect the CDW modulations in this crystal.

44322 Positron annihilation in a homologous series of liquid crystals. Nash, J.K.; McNutt, J.D.; Sharma, S.C.; Diana, L.M.; Kafle, S.R.S.; Coleman, P.G. (Texas Univ., Arlington (USA). Center for Positron Studies). pp 742-744 of Positron annihilation. Proceedings of the sixth international conference held at The University of Texas at Arlington, April 3-7, 1982. Coleman, P.G.; Sharma, S.C.; Diana, L.M. (Texas Univ., Arlington (USA). Center for Positron Studies) (eds.). Amsterdam (Netherlands); North-Holland (1982). (CONF-820434—).

From 6. international conference on positron annihilation; Arlington, TX, USA (3 Apr 1982).

Positron lifetime spectra have been measured for three members of 4,4'-di-n-alkoxyazoxybenzenes, a homologous series of nematic liquid crystals. The lifetime spectra were measured as a function of temperature from solid to isotropic liquid phase, and resolved into a maximum of four lifetime components. The observed behavior of the resolved annihilation parameters can be interpreted in terms of changes in the intermolecular forces.

40 CHEMISTRY

4001 Analytical And Separations Chemistry

REFER ALSO TO CITATION(S) 43192, 43193, 43202, 43434, 43468, 44013, 44304, 44613, 44879, 44894, 44895, 44896

44323 (BMFT-FB-T—83-134) Mass spectrometric analysis of silicon for solar cells. Hurrle, A. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). 1983. 31p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751156.

With 6 refs., 5 tabs., 3 figs.

Spark source mass spectrometry has been used to analyze solid and powdered silicon samples. Gallium has been used as a binder to press solid electrodes from powdered samples. By means of self-prepared standards relative sensitivity factors have been determined for all important elements with the exception of C and S. By comparison with other analytical methods it has been shown, that the analytical results obtained from powdered Si are generally accurate within a factor of two. Detection limits for most elements are in the range 0.02 - 1ppma.

44324 (DOE/ER/60063—1) Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios. Walsh, F. (Tracer Technologies, Inc., Newton, MA (USA)). May 1983. Contract AC02-82ER60063. 30p. NTIS, PC A03/MF A01. Order Number DE83014628.

The use of the stable isotope of carbon, ^{13}C, as a tracer in oil/gas exploration or in medical diagnosis has been limited by the inconvenience of the use of the ratio mass spectrometer. The availability of an operator-easy, low-cost, accurate and precise analytical instrument capable of high throughput would increase the use of ^{13}C as a tracer. The objective of this program was to further develop and test a laser-based photoacoustic spectrometer and to demonstrate its capabilities in $^{13}CO_2/^{12}CO_2$ measurement. Under the program, TRACER developed a signal analysis system which, when coupled with a rf-modulated CO_2 laser and an improved spectrophone, provided high levels of precision and accuracy in CO_2 and $^{13}CO_2$ measurement. CO_2 concentrations were measured with this system at a precision of +-0.0003%; $^{13}CO_2/^{12}CO_2$ was measured with a precision of +-0.004%. Future recommended directions include use of a higher-power $^{12}CO_2$ laser, a dual spectrophone system for internal signal normalization, and system redesign to account for the effect of moisture in samples.

44325 (INIS-mf—7919) Investigations for chromatographic separation and determination of the rare earths and auxiliary group elements. Post, K. (Bochum Univ. (Germany, F.R.). Abt. Chemie). 5 Feb 1981. 212p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83780879.

Different methods have been developed to quantitatively determine rare earth elements after their column chromatographic separation. The influence of the active solvents in the running systems diethyl ether/tetra hydrofuran (THF)/nitric acid (HNO_3) and diethyl ether/bis-(2-ethyl hexyl) phosphate (HDEHP)/HNO_3 was investigated on the column chromatographic separation of all rare earth elements which is possible by the synergistic combination of the active running components THF and HDEHP. Furthermore, product isotopes could also be separated using the running agents described here in investigations to separate fission product mixtures of irradiated uranium. (orig./HBR).

44326 (KFTI—82-14) Pair gamma-spectrometer. Nemashkalo, B.A. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702187.

9 refs.; 6 figs.

A pair gamma-spectrometer based on Ge-Li detector of coaxial type, surrounded by four-sectional ringed NaI(TL) detector, has been developed and constructed. Efficiency of γ-quanta detection by pair gamma-spectrometer can be 10-25% in relation to the efficiency of unicrystal one. Suggested and realized is a new method to determine the efficiency of the spectrometer, taking automatically into account γ-quanta detection efficiency changes, that arise in different cases during an experiment, including the case of electronics instability. Account of errors is brought about in correspondence with the number of coincidences of annihilation γ-quanta with γ-quanta of 1.274 MeV, arising during the consequent β^+- γ-decay of ^{22}Na source, which is placed in converter in front of Ge-Li detector.

44327 (LA-UR—83-1854) Single-pulse coherent Raman spectroscopy in shock-compressed benzene. Moore, D.S.; Schmidt, S.C.; Schiferl, D.; Shaner, J.W. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 9p. (CONF-830763—1). NTIS, PC A02/MF A01. Order Number DE83014140.

From 9. AIRAPT conference; Albany, NY, USA (25 Jul 1983).

Portions are illegible in microfiche products.

Single-pulse backwards stimulated Raman and reflected broadband coherent anti-Stokes Raman spectroscopy (BSRC and RBBCARS) have been used to measure the vibrational frequency shifts of the 992 cm^{-1} ring-stretching mode of liquid benzene shock-compressed to pressures up to 1.2 GPa. The resulting shifts of ~ 7.5 cm^{-1}/GPa in the dynamic experiments are compared to spontaneous Raman-scattering measurements of heated samples compressed in a diamond-anvil cell. RBBCARS was used to simultaneously measure the ring-stretching mode vibrational frequencies of liquid benzene/liquid perdeuterobenzene mixtures shock-compressed to pressures up to 1.53 GPa. Additional experiments that demonstrate the difficulty of using polarization-sensitive coherent Raman techniques, such as Raman-induced Kerr effect spectroscopy (RIKES), in shock-compressed samples are described.

44328 (Y/DK—345) Determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions by potentiometric titration. Tucker, H.L.; McElhaney, R.J. (Oak Ridge Y-12 Plant, TN (USA)). 1983. Contract W-7405-ENG-26. 19p. (CONF-830589—2). NTIS, PC A02/MF A01. Order Number DE83013565.

From 10. National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCHE) annual meeting; Knoxville, TN, USA (25 May 1983).

A simple, fast method for the determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions has been adapted from the Davies-Gray volumetric method to meet the needs of Y-12. One-gram duplicate aliquots of uranium metal or uranium oxide are dissolved in 1:1 HNO_3 and concentrated H_2SO_4 to sulfur trioxide fumes, and then diluted to 100-mL volume. Duplicate aliquots are then weighed for analysis. For uranyl nitrate samples, duplicate aliquots containing between 50 and 150 mg of U are weighed and analyzed directly. The weighed aliquot is transferred to a Berzelius beaker; 1.5 M sulfamic acid is added, followed in order by concentrated phosphoric acid, 1 M ferrous sulfate, and (after a 30-second interval) the oxidizing reagent. After a timed 3-minute waiting period, 100 mL of the 0.1% vanadyl sulfate-sulfuric acid mixture is added. The sample is then titrated past its endpoint

with standard potassium dichromate, and the endpoint is determined by second derivative techniques on a mV/weight basis.

44329 Comment on "spin-polarized Auger spectroscopy from magnetically ordered solids". Zajac, G.; Zak, J.; Bader, S.D. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review Letters;* **50**: No. 21, 1713(23 May 1983).

A Comment on the Letter by M. Landolt and D. Mauri, Phys. Rev. Lett. 49, 1783 (1982).

44330 Selective laser excitation of terbium(III) in lanthanum(III) fluoride precipitates. Ensor, D.D. (Tennessee Technological Univ., Cookeville); Pippin, C.G.; Young, J.P.; Ramsey, J.M. *Analytical Chemistry;* **54**: 2636-2637(1982). Contract AS05-79ER10489.

The analysis of lanthanides by selective laser excitation in coprecipitated CaF_2 has been reported by Gustafson and Wright. This technique was shown to be extremely sensitive, exhibiting detection limits in the range of 1 pg/mL for several lanthanides. The fluorescence spectra of the lanthanides were characterized by four different excitation sites. These sites result from charge compensation when a +3 ion is substituted in a +2 ion matrix. Various ignition temperatures were used to produce a specific site. The technique is sensitive to various interfering ions including Na^+ and has a reproducibility of 4 to 8% relative standard deviation (RSD). This work reports the use of LaF_3 as the host precipitate for the study of Tb(III) and Er(III). The use of LaF_3 as a coprecipitating agent for rare earths is a common technique. The Tb(III) or Er(III), due to size and charge similarities, should occupy a single site in the lattice and thus greatly simplify their excitation and emission response. As a result, the procedure would be simplified and perhaps less sensitive to environmentally significant interfering ions. 2 figures.

44331 Cationic ruthenium-nitrosyl complexes in radioactive waste solutions. Glatz, J.P. Saarbruecken, Germany, F.R.; Universitaet des Saarlandes (1980). 169p. (In German). Available from the library of Universitaet des Saarlandes, Saarbruecken (Germany, F.R.).

Diss. (D.Sc.).

By means of counterpressure column electrophoresis using Lichroprep Si 60 as a carrier medium it has been possible for the first time to isolate and thus analyze all cationic ruthenium-nitrosyl-nitrato complexes. The composition of the various complexes is determined from the ion charge revealed by the migration path during electrophoresis, and from the content of Ru, NO and NO_3^-. The denitration of simulated high-activity and medium-activity waste solution with formaldehyde or formic acid results in the formation of formato complexes, the composition of which can be determined by a new method corresponding to the one used for nitrato complexes. The extraction of ruthenium with TBP Dodecane will predominantly yield neutral complexes, but a reduction in temperature and a high amount of impurity electrolytes will favour the extraction of all complexes. (orig./RB).

44332 Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria. Luxenberg, P. Muenchen, Germany, F.R.; Technische University (1979). 207p. (In German). Available from the library of Technische Univ. Muenchen (Germany, F.R.).

Diss. (D.Sc.).

It has been the purpose of this study to find a method of separating pure uranium-232 produced by nuclear reactions of protactinium-231, as uranium-232 is an uranium isotope of considerable significance in science and technology. A method using anion chromatography for the separation of U, Th, Pa, Nb, and Zr has been developed and is described here, based upon studies of the adsorption behaviour (partition) of the elements from alcohol-H_3O-HCl-HF mixtures of systematically modified composition. In the second part of the thesis, the complex equilibria in the systems mentioned above are studied, especially with regard to the role played by the fluoride ions. Theoretical data are supplemented by deformation obtained by potentiometric measurements describing the thermodynamic parameters; finally, possible advantage to be gained from using fluoride, chloride electrodes are presented. (RB).

44333 (K-Trans—187) Quantitative determination of phosphorous and hypophosphorous acid. Wolf, L.; Jung, W. Translated from *Zeitschrift fuer Anorganische und Allgemeine Chemie ;* **201**: 337-346(1931). Contract W-7405-ENG-26. 13p. NTIS, PC A02/MF A01. Order Number DE83014109.

Portions are illegible in microfiche products.

Instructions have been developed for the iodometric determination of phosphorous and hypophosphorous acid, singly and in combination. Iodine in bicarbonate alkaline solution is used to accomplish the oxidation. (DLC)

4002 Inorganic And Physical Chemistry

REFER ALSO TO CITATION(S) 43163, 44244, 44320, 44355, 44357, 44367

44334 (DOE/ER/06034—T7) Theoretical model for the luminescing excited states of Ru $(bpy)_3$2i and Os$(bpy)_3^{2+}$ (bpy = 2,2'-bipyridine). Kober, E.M.; Meyer, T.J. (North Carolina Univ., Chapel Hill (USA). Dept. of Chemistry). 1981. Contract AS05-78ER06034. 52p. NTIS, PC A04/MF A01. Order Number DE83014996.

A theroetical model is developed here for the Metal to Ligand Charge Transfer (MLCT) excited states of Ru$(bpy)_3^{2+}$ and Os$(bpy)_3^{2+}$ assuming that the promoted electron is localized upon one bipyridine. The effects of ligand field splittings, spin-spin coupling, and spin-orbit coupling are included in the model. It is found that four low-lying excited-state behavior below 300K. A similar previously developed model that assumed that the promoted electron is delocalized over all three bipyridines is found to predict five low-lying states. The luminescence polarization and relative radiative and non-radiative decay lifetimes of the low-lying states for both models are predicted on the basis of the symmetry and the amount of singlet character in these states. It is found that the localized model can easily account for the available experimental data and that explicit states assignments can be made. Further, it is found that the delocalized model cannot radionalize the experimental data. It is concluded that the excited states must be viewed as localized in agreement with other experimental evidence. 6 figures, 6 tables.

44335 Derived sensitivity densities in chemical kinetics: A new computational approach with applications. Larter, R.; Rabitz, H.; Kobayashi, M. (Department of Chemistry, Indiana—Purdue University at Indianapolis, Indianapolis, Indiana 46223). *Journal of Chemical Physics;* **79**: No. 2, 692-707(15 Jul 1983).

Partial differential equations for derived sensitivity densities corresponding to reaction/diffusion problems are developed. The elementary sensitivity densities do not appear explicitly in these equations thus showing that the derived sensitivity densities need not be "derived" from the elementary densities, but may be calculated directly. The derived sensitivities allow for studies of the interrelationship between chemical species concentrations at different locations in space and points in time. In a similar fashion the interactive role of system variables can be examined including the intriguing case of correlation between kinetic and transport effects for controlling the overall reaction. The method is demonstrated for a three-species linear reaction/diffusion problem for which an exact solution is available. The resulting sensitivity densities are found to have an enlightening physical interpretation which may be applied to more complicated reaction/diffusion problems.

44336 Phenomenological study of heterogeneous chemical reactions of mercuric chloride on heated stainless steel surfaces. Wang, R.; Dillon, M.A.; Spence, D. (Argonne National Laboratory, Argonne, Illinois 60439). *Journal of Chemical Physics;* **79**: No. 2, 1100-1101(15 Jul 1983). Contract W-31-109-ENG-38.

We have made the first measurements of the products of surface chemical reactions of mercuric chloride on heated stainless steel using the technique of electron-energy-loss spectroscopy as an analytic tool. We find that $HgCl_2$ reacts with hydrogen in the stainless steel to form hydrochloric acid HCl. Under our experimental conditions HCl becomes the cominant species observed in our spec-

tra at surface temperatures greater than about 150 °C. The possible consequences of our observation on the efficiency of mercuric halide lasers is discussed. (AIP)

44337 Gaseous ion reactions in SiF_4 and SiF_4—D_2 mixtures. Senzer, S.N.; Lampe, F.W. (Davey Laboratory, Department of Chemistry, The Pennsylvania State University, University Park, Pennsylvania 16802). *Journal of Applied Physics;* **54**: No. 6, 3524-3527(Jun 1983). Contract AC02-76ER03416.

The gas-phase reactions of D^+_3, D^+_3, SiF^+, and SiF^+_3 with SiF_4 and of SiF^+ and SiF^+_3 with D_2 have been studied in the center-of-mass energy range of 0.2—7 eV using a tandem mass spectrometer. Only one reaction of a silicon-containing ion with SiF_4 was observed, namely the highly endothermic transfer of F^- from SiF_4 to SiF^+. Hence the SiF_4 molecule must be almost unique in showing a virtual absence of gas-phase ionic chemistry in pure SiF_4 subjected to ionization. Several ion-molecule reactions were observed in the SiF_4—D_2 system but of these only the dissociative F^- transfer from SiF_4 to D_3^+ is exothermic. The almost total absence of exothermic ion-molecule reactions means that the ionic distribution pertinent to the plasma chemistry of the SiF_4 and SiF_4—H_2 systems will be determined solely by the cross sections of the electron impact ionization processes.

44338 Enthalpies of formation of strontium dichloride and of the strontium ion (Sr^{2+}) in water and in 1 mol.dm^{-3} HCl, and an assessment of enthalpies of formation of alkaline-earth dichlorides. Morss, L.R.; Williams, C.W. (Argonne National Lab., IL (USA)). *Journal of Chemical Thermodynamics;* **15**: No. 3, 279-285(Mar 1983).

Measurements of the enthalpy of solution of $SrCl_2$ in water and in 1 mol.dm^{-3} HCl solution lead to $\Delta H°sub(f)(SrCl_2, c, 298.15 K) = -(832.7 +- 0.9)$ kJ.mol^{-1}, and to $\Delta H°sub(f)$ (Sr^{2+}, aq, 298.15 K) = -(549.7 +- 0.9) kJ.mol^{-1}. Literature data have been assessed to calculate corresponding enthalpies of formation for the other alkaline-earth ions as well as the enthalpies of formation of the alkaline-earth dichlorides in 1 mol.dm^{-3} HCl.

44339 Silane surface chemistry of palladium: synthesis of silaethylene, silacyclobutadiene, and silabenzene. Gentle, T.M.; Muetterties, E.L. (Lawrence Berkeley Lab., CA). *Journal of the American Chemical Society;* **105**: No. 2, 304-305(26 Jan 1983). Contract AC03-76SF00098.

Chemisorption of cycloalkenes on metal surfaces is followed by dehydrogenation processes that often give chemisorbed C/sub n/H/sub n/ species e.g., cyclohexene → benzene and cyclooctadiene → cyclooctatetraene. Because these transformations are facile, this report explores the reactions of organosilanes with single-crystal metal surfaces as routes to compounds in which there are Si-C bonds of mutliple bond order. With platinum and nickel, we observed either no dehydrogenation or gross degradation of the silaalkane. Palladium, however, has furnished dehydrogenation syntheses of silaethylenes, silabenzene, and what appears to be silacyclobutadiene.

44340 Raman and visible-ultraviolet spectra of polyhalide anions in molten I_2/KI-LiI, I_2/CsCl-LiCl, and I_2-ICl/CsCl-LiCl. Child, W.C. Jr. (Carleton Coll., Northfield, MA); Papatheodorou, G.N. *Journal of Physical Chemistry;* **87**: No. 2, 271-275(20 Jan 1983).

Molten eutectic mixtures of KI-LiI and CsCl-LiCl at 300-400°C were equilibrated with I_2 vapor or I_2-ICl vapor at pressures of 0.002-2 atm and were investigated by means of Raman and visible-UV spectroscopy. The observed polarized Raman bands were attributed to the symmetric stretching vibrations of I_3^- (112 cm^{-1}), I_2Cl^- (184 cm^{-1}), and ICl_2^- (271 cm^{-1}). Further evidence for the presence of these trihalide anions in the melts was given by the visible-UV spectra. A band at 161 cm^{-1} in the Raman spectrum of the I_2/KI-LiI melt was attributed to a polyiodide of higher molecular weight than the triodide. There is evidence for the disproportionation of I_2Cl^- in the I_2/CsCl-LiCl melt.

44341 Electronic structure of H/sub n/$^+$ and HeH/sub n/$^+$ clusters. Raynor, S.; Herschbach, D.R. (Harvard Univ., Cambridge, MA). *Journal of Physical Chemistry;* **87**: No. 2, 289-293(20 Jan 1983). Contract AC02-79ER10470.

The "solvation" of a H_3^+ molecule-ion by H_2 molecule(s) and/or a He atom was examined in ab initio electronic structure calculations. Binding energies and geometrical parameters were determined for the ground electronic states of H/sub n/$^+$ (n = 3,5,7,9,11) and HeH/sub n/$^+$ (n = 3,5,7,9) cluster ions. Floating spherical Slater orbitals (FSSO) were employed with full single and double configuration interaction (CI). All of the clusters studied were found to be weakly bound (with respect to removal of "solvent" species). Inclusion of configuration interaction had a major effect; for n ≧ 5, it increased the energy required to remove an H_2 molecule from H/sub n/$^+$ by ~35% and that to remove the He atom from HeH/sub n/$^+$ by ~300-400%. The net solvation energy per H_2 (~3.5 kcal mol^{-1} for the first three solute molecules, ~1.5 kcal mol^{-1} for the fourth) was found to be about threefold larger than for He.

44342 Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion. Kappel, M.J.; Raymond, K.N. (Univ. of California, Berkeley). *Inorganic Chemistry;* **21**: No. 9, 3437-3442(Sep 1982). Contract W-7405-ENG-48.

Complexation equilibria have been evaluated by potentiometric titration of several biologically significant divalent metals as well as Fe(III) with the sulfonated poly(catecholate) ligands 1,6-bis(2,3-dihydroxy-5-sulfobenzoyl)-1,6-diazahexane(4-LICAMS), 1,3,5-tris(((2,3-dihydroxy-5-sulfobenzoyl)amino)methyl)benzene (MECAMS), and 1,5,10,14-tetrakis-(2,3-dihydroxy-5-sulfobenzoyl)-1,5,10,14-tetraazatetetradecane (3,4,3-LICAMS). For all ligands studied the titrations demonstrate the following relative stabilities Fe(III) >> Cu(II) > Zn(II) > Ni(II), Co(II) > Mg(II) > Ca(II). These poly(catechoylamide) ligands possess great selectivity for ions of high charge to ionic radius ratios such as Fe(III) and Pu(IV); their selectivity is similar to that shown by desferrioxamine B, the current chelating agent for iron overload, and is greater than that demonstrated by DTPA, the chelating agent most often used for plutonium and other heavy-metal ion decorporation.

44343 Two zicronium iodide clusters. Hexazirconium dodecaiodide (Zr_6I_{12}) and cesium hexazirconium tetradecaiodide ($CsZr_6I_{14}$). Guthrie, D.H.; Corbett, J.D. (Univ. of Iowa, Ames). *Inorganic Chemistry;* **21**: No. 9, 3290-3295(Sep 1982). Contract W-7405-ENG-82.

Gem- or rod-shaped crystals of the title compounds are obtained from the reaction of ZrI_4, excess Zr strips and, for the latter, CsI at 850-925°C for 15-40 days in welded tantalum containers. The structures of both were determined from diffraction data collected on a four-circle diffractometer with Mo Kα radiation at room temperature. Zr_6I_{12}(γ-ZrI_2)(R-3, a = 14.502 (2) angstrom, c = 9.996 (2) angstrom, Z=3) contains a slightly compressed metal antiprism (d(Zr-Zr) = 3.204 (2) and 3.194 (1) angstrom) in which the six iodine atoms bridging waist edges of the metal antiprism also occupy exo positions in six other clusters giving the representation Zr_6I/sup i/$_6$I/sup i-a/$_6$/$_3$I/sup a-i/$_6$/$_2$ (i = inner, a = outer). Extended Huckel calculations support the notion that trigonal distortion of the metal cluster is responsible for its diamagnetism. The structure of $CsZr_6I_{14}$ (Cmca, a = 15.833 (2) angstrom, b = 14.300 (3) angstrom, c = 12.951 (2) angstrom, Z=4) is derived from that known for Nb_6Cl_{14} and Ta_6I_{14} by addition of cesium to a large interstice. The unsymmetric bridging in Cs(Zr_6I/sup i/$_{10}$I/sup i-a/$_2$I/sup a/$_4$/$_2$) produces a tetragonally distorted metal octahedron with average distances of 3.29 angstrom (x8) and 3.35 angstrom (x4). The two structures also consist of approximately ccp M_6X_{12} units, with cesium in all octahedral holes in the latter. These and some related phases may also be described systematically in terms of close-packed halogen layers containing ordered vacancies, interstitials, and clusters of metal atoms in octahedral holes.

44344 **(UCRL-Trans—11880) Calculation of the SHG coefficients of $NaNO_2$ crystals by using CNDO/S method.** Chen, C.T.; Lui, Z.P.; Shan, H.S. Translated from *Wu Li Hsueh Pao ;* 30: No. 6, 715-721(1981). Contract W-7405-ENG-48. 14p. NTIS, PC A02/MF A01. Order Number DE83014515.

Portions are illegible in microfiche products.

This essay describes the study in which the CNDO/S method was used to calculate the single electron molecular orbitals of (NO_2). A general computer program for group theory was used to calculate the SHG coefficients of $NaNO_2$ crystals. The calculated and experimental values showed satisfactory agreement. The calculation results clearly show that the anisotropy of the SHG coefficients of $NaNO_2$ crystals is primarily due to the conjugated π-molecular orbitals of the (NO_2) group. Moreover, the calculations in this study indicate that this method may provide quantitative predictions in the search for new non-linear optical materials. This study also discusses the two-level model of non-linear effects as well as its limitations.

44345 **Isotopic labelling applied to the infrared spectra of metal complexes.** Niven, M.L. Cape Town, South Africa; University of Cape Town (1980). 110p. Available from the Registrar, University of Cape Town, Rondebosch, 7700, South Africa.

Thesis (Ph.D.).

An ir investigation of a series of 2-aminomethyl-pyridine complexes of first transition metal (II) perchlorates, tetrafluoroborates, halides and thiocynates is reported. Comparisons with the spectra of related complexes of 2,2'-bipyridine and ethylenediamine together with metal-ion substitution, deuteration and ^{15}N isotopic labelling of the amino group in 2-aminomethylpyridine enable reliable band assignments to be made. The study shows that in complexes of the type $M(amp)nX_2$, metal-to-amino-nitrogen stretches occur frequencies greater than 350 cm^{-1}, while the metal-to-pyridine-nitrogen stretches are generally below 300 cm^{-1}, the assignment of the latter being generally complicated by the presence of metal-to-halogen vibrations. The ir spectra of quinoline, quinoline-d_7 and their metal complexes are examined in order to determine the ratio $\nu D/\nu H$ for bands assigned to the C-H(D) and ring modes of the heterocylic ring. Practically without exception, $\nu D/\nu H$ falls within the ranges 0.76 plus minus 0.08(C-H(D) modes) and 0.92 plus minus 0.08 (ring modes). The potensial usefulness of the results is discussed. An investigation of the complexes $M(acac)_2B$ and $Na[M(acac)_3]$ where M = Co(II), Ni(II) or Zn(II), and B = 2,2'-bipyridine, 2-aminomethylpyridine and ethylenediamine is also discussed, complete band assignments in the ir spectra (4000) - 150 cm $^{-1}$) of a number of M(II) and M(III) complexes of glycine have been carried out using the technique of multiple isotopic labelling and an x-ray crystallographic investigation of the hexakis(urea) chromium(III) chloride trihydrate has been carried out. Multiple isotopic labelling of the urea molecules in complexes of that ligand with Pt(II) and Pd(II) is also discussed in relation to an examination of their ir spectra.

44346 **Oxygen-perovskites with fourvalent rare earth metals.** Kristen, H.R. Freiburg, Germany, F.R.; Freiburg University (1978). 126p. (In German). Available from the library of Freiburg Univ. (Germany, F.R.).

Diss. (D.Sc.).

The quadrivalent oxidation stage of the elements praseodymium and terbium can be easily prepared as oxides $BaPrO_3$ and $BaTbO_3$ crystallizing with the Perovskite structure. From this observation one has tried to stabilize the elements neodymium and dysprosium in the lanthanide series by including a host lattice with Perovskite structure. $BaCeO_3$, $BaPrO_3$, $BaZrO_3$, $BaThO_3$, $BaTbO_3$, $SrCeO_3$ and $SrTbO_3$ are used as host lattices. The preparation was carried out by simple annealing of the corresponding oxides with $BaCO_3$ or $SrCO_3$ in air at 1350°C. X-ray and analytical characterization showed that Nd(IV) and Dy(IV) were partly taken up by a few host lattices. (orig./HBR).

44347 **(UCRL-Trans—11838) Water content in solids.** Rasmussen, K.E. Translated from *Norges Apotekerforenings Tidsskrift ;* 78: 142-149(1970). Contract W-7405-ENG-48. 13p. NTIS, PC A02/MF A01. Order Number DE83011249.

The physics and chemistry of water attached to solid substances, particularly drugs, are discussed. Chemically bound water is divided into water of crystallization and structural water; physically bound water is divided into absorbed water, adsorbed water, and enclosed water. These subdivisions are described and methods for dealing with unwanted water content presented. (ACR)

4003 Organic Chemistry

REFER ALSO TO CITATION(S) 44319, 44334, 44345

44348 **(DOE/ER/10362—T2) Utilization of magnetic effects as a means of isotope enrichment. Annual technical progress report, July 1, 1982-June 30, 1983.** Turro, N.J. (Columbia Univ., New York (USA). Dept. of Chemistry). 1983. Contract AC02-79ER10362. 6p. NTIS, PC A02/MF A01. Order Number DE83015576.

Major research emphasis has been directed toward identifying new reaction environments that are suitable for the observation of large magnetic isotope effects. We have explored solid surfaces, such as porous silica and zeolites, as environments which might serve as closed reaction spaces for enhancement of magnetic isotope effects. Our preliminary findings are very encouraging and will serve as a platform for future research. The following current research is discussed: values of isotope enrichment parameter α for photolysis of dibenzyl ketone on solid surfaces; values of α for substituted dibenzyl ketones in various environments; ^{13}C enrichment in 1-phenyl-4-methylacetophenone. 1 figure, 3 tables.

44349 **(DOE/ER/10603—T2) Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report.** Rieke, R.D. (Nebraska Univ., Lincoln (USA). Dept. of Chemistry). 30 Jun 1983. Contract AC02-80ER10603. 15p. NTIS, PC A02/MF A01. Order Number DE83014962.

Portions are illegible in microfiche products.

We are continuing our efforts to prepare highly reactive metal powders and study the reactions of these highly reactive metal powders with organic and inorganic substrates. We have developed several new reactions which have resulted in the synthesis of many new compounds which were therefore unobtainable by standard approaches. Our current efforts have concentrated mainly of the preparation and study of Ni, Cd, U, and Fe.

44350 **(DOE/ER/10641—1) Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986.** Baer, T. (North Carolina Univ., Chapel Hill (USA). Dept. of Chemistry). 1983. Contract AS05-80ER10641. 18p. NTIS, PC A02/MF A01. Order Number DE83013717.

Organosulfur molecules will be investigated by photoionization techniques in order to accurately determine the heats of formation of organosulfur ions and fragments. The structures will be determined by ab initio molecular-orbital calculations. A considerable effort will be devoted to the study of both cyclic and acyclic disulfides, and the structures of their ions in the gas phase. Oxygen-17 and sulfur-33 NMR Spectroscopy will be used to explore the fundamental aspects of bonding interactions between S-S and S-O bonds. Both ^{17}O and ^{33}S NMR will be used for structure determinations with emphasis on (i) the influence of substituent effects on ^{17}O and ^{33}S NMR chemical shifts and (ii) development of rapid analytical method for determining the form of oxidized sulfur in organic mixtures. 2 figures, 1 table.

44351 **(SAND—83-0536C) Post-shock chemical and ESR analysis of acrylamide and selected anthracene derivatives.** Dodson, B.W.; Arnold, C. Jr.; Venturini, E.L.; Lenahan, P.M. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 4p. (CONF-830719—6). NTIS, PC A02/MF A01. Order Number DE83015207.

From Topical conference on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

Portions are illegible in microfiche products.

We report on a series of impact recovery experiments performed on organic samples. Acrylamide was loaded to peak stresses of 4.8 and 6.7 GPa in a copper capsule using an air-driven projectile. No polyacrylamide was formed in these impact experiments. ESR studies reveal ~ 1 ppM free radicals, which are stable in the acrylamide lattice. Upon solution in tetrahydrofuran (THF), these radicals become mobile, resulting in polymer formation, a reaction not seen in unshocked acrylamide and 9-cyanoanthracene (9-CA) in the stress range 1.8 to 4.0 GPa. The residual radical density in the 9-CA was roughly 10 times that in the anthracene. A systematic relation between peak stress and formation of specific radicals were observed. 3 figures.

44352 **Selective vibrational excitation of the ethylene—fluorine reaction in a nitrogen matrix. II.** Frei, H. (Laboratory of Chemical Biodynamics, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Journal of Chemical Physics;* **79**: No. 2, 748-758(15 Jul 1983).

The product branching between 1,2-difluoroethane and vinyl fluoride (plus HF) of the selective vibrationally stimulated reaction of molecular fluorine with C_2H_4 has been studied in a nitrogen matrix at 12 K and found to be the same for five different vibrational transitions of C_2H_4 between 1896 and 4209 cm^{-1}. The HF/DF branching ratio of the reaction of F_2 with CH_2CD_2, trans-CHDCHD, and cis-CHDCHD was determined to be 1.1, independent of precursor $C_2H_2D_2$ isomer and particular mode which excited the reaction. These results, as well as the analysis of the mixtures of partially deuterated vinyl fluoride molecules produced by each $C_2H_2D_2$ isomer indicate that the product branching occurs by $\alpha\beta$ elimination of HF(DF) from a vibrationally excited, electronic ground state 1,2-difluoroethane intermediate. Selective vibrational excitation of fluorine reactions in isotopically mixed matrices t-CHDCHD/C_2H_4/F_2/N_2 and CH_2CD_2/C_2H_4/F_2/N_2, and in matrices C_2H_2/C_2H_4/F_2/N_2 revealed a high degree of isotopic and molecular selectivity. The extent to which intermolecular energy transfer occurred is qualitatively explained in terms of dipole coupled vibrational energy transfer. A study of the loss of absorbance of the C_2H_4 x F_2 pairs in case of ν_9 as a function of both the laser irradiation frequency within the absorption profile, and the ethylene concentration showed that the C_2H_4 x F_2 absorption is inhomogeneously broadened. Substantial depletion of reactive pairs which did not absorb laser light is interpreted in terms of Forster transfer.

44353 **Molecular structure of hydrocarbon monolayers on metal surfaces.** Koestner, R.J.; Van Hove, M.A.; Somorjal, G.A. (Univ. of California, Berkeley). *Journal of Physical Chemistry;* **87**: No. 2, 203-213(20 Jan 1983). Contract AC03-76SF00098.

Recent studies of the molecular structure and chemical bonding of organic monolayers on metal surfaces are reviewed. Most of the research is concentrated on alkenes and alkynes adsorbed on platinum and rhodium. The applications of low-energy electron diffraction, high-resolution electron energy loss spectroscopy, and thermal desorption spectroscopy provided most of the structural and bonding information in studies that utilized single-crystal metal surfaces. Hydrocarbon monolayers exhibit a rich and diverse structural chemistry that may be correlated to analogous organometallic clusters. Alkylidyne (==C(CH_3)/sub n/CH_3) bonding predominates near 300 K on Pt and Rh although a variety of different molecular conformations is found. Perhaps the most pronounced characteristic of the organic monolayers is the temperature-dependent variation of their structure and bonding. The bonding also varies markedly across the periodic table; much stronger for the early transition metals (W, Fe) and much weaker on Ag and Cu than on Pt and Rh. These temperature- and metal-dependent trends are altered to some extent when considering different crystallographic planes for the metal surface. Finally the possible directions that this field of research may take are discussed.

44354 **Studies on the reaction of nitric acid and sugar.** MacDougall, C.S.; Bayne, C.K.; Roberson, R.B. (Oak Ridge National Laboratory Analytical Chemistry Division, P.O. Box X, Oak Ridge, Tennessee 37830). *Nuclear Technology;* **58**: No. 1, 47-52(Jul 1982).

The design of vessels and off-gas systems for denitrating acidic radioactive process solutions by reacting nitric acid with sugar requires a fairly accurate determination of the rate of the controlling step. Therefore, the reaction of sugar with concentrated nitric acid was closely examined at temperatures of 100 and 110°C and in the presence of low levels of iron)0 to 0.2 M Fe(III)). Efficiencies of the sugar destruction by nitric acid ranged from 2.56 to 2.93 mol of acid consumed per mole of carbon added. Product offgases were examined throughout the reaction. Release of CO was fairly constant throughout the reaction, but amounts of CO_2 increased as the nitric acid began to attack the terminal carboxylic acids produced from the consumption of sucrose. Voluminous quantities of NO_2 were released at the beginning of the reaction, but larger relative concentrations of NO were observed toward the end.

44355 **Symmetry groups of chemical graphs.** Balasubramanian, K. (Johns Hopkins Univ., Baltimore, MD). *International Journal of Quantum Chemistry;* **21**: 411-418(1982). Contract W-7405-ENG-48.

The symmetry groups of all trees are shown to be expressible as generalized wreath products by a tree pruning algorithm. The symmetry groups of certain cyclic graphs which can be expressed as generalized compositions are also shown to be generalized wreath products. The symmetry groups of complete multipartite graphs can be obtained in a similar manner. Character tables of symmetry groups of certain chemical graphs are also obtained.

4004 Electrochemistry

REFER ALSO TO CITATION(S) 43525, 44059

4005 Photochemistry

REFER ALSO TO CITATION(S) 44350

44356 **(DOE/ER/10457—4) Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983.** Richman, R.M. (Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Chemistry). 1983. Contract AC02-79ER10457. 17p. NTIS, PC A02/MF A01. Order Number DE83015192.

Portions are illegible in microfiche products.

To gain insight into possible strategies for solar energy conversion, photochemical experiments have been designed. A number of systems have been studied in the past year. $(MnPc)_2O$ and $(CrTPP)_2O$ were abandoned early when we could not find a way to prepare them in pure form. More interesting results have been obtained for $(FeTPPC)_2O$, $(FeTPP)_2O$ and $[O(Ru(NH_3)_5)_2]^{4+}$. These systems were discussed in greater detail. Substantial preliminary results have been obtained for $(FeTPP)_2N$, $(FeTPP)_2C$, and some mixed metal oxo-bridged porphyrins. Some of the observations are: (1) a pH 10 solution of $(FeTTPC)_2O$ with either TEOA (triethanolamine) or EDTA (ethylenediaminetetraacetate) can be clearly photoreduced to FeTPPC and the approximate amine oxide at wavelengths shorter than 400 nm. The quantum yield of FeTPPC at 365 nm is 1.7×10^{-3}; (2) irradiating a cyclohexene solution of $(FeTPP)_2O$ in the presence of O_2 at low intensity (sun light) for a period of four months resulted in formation of cyclohex-2-ene-1-one as the primary product. Higher intensities (450 medium pressure Hg lamp through a 350 cutoff filter, either with or without O_2) resulted in cyclohex-2-ene-1-ol as the primary product. A reaction mechanism has been proposed based on these results; (3) irradiation into the 500 nm band of μ-oxo-bis(pentaammineruthenium(II))(4^+) dimer, (D4+), resulted in photosubstitution of an ammonia ligand by water with a quantum yield of $3.2 + 10^{-3}$ moles/einstein in aqueous solution; and (4) the product of photosubstitution, D4+′, is photoactive in a manner quite different from its predecessor upon irradiation into its 500 nm band.

44357 **Fe^* emission yield and photoionization of $Fe(CO)_5$ by vacuum-ultraviolet radiation.** Horak, D.V.; Winn, J.S. (Univ. of California, Berkeley). *Journal of Physical Chemistry;* **87**: No. 2, 265-271(20 Jan 1983). Contract AC03-76SF00098.

A crossed vacuum-UV photon-$Fe(CO)_5$ molecular beam experiment was used to study the Fe^* emission and the $Fe(CO)_5$ photoionization yields induced by vacuum-UV photons in the 9-21-eV range. Fe emission from quintet spin states was observed, and the total 2000-8500-angstrom Fe^* fluorescence quantum yield was modeled over the 9-14-eV range by a restricted-degrees-of-freedom statistical dissociation model first used to explain Fe fluorescence produced by metastable rare gas collisions. Over this range, absolute cross sections for dissociation into neutrals, dissociation into fluorescing neutrals, and photoionization were determined.

4006 Radiation Chemistry

REFER ALSO TO CITATION(S) 43519

44358 **(CONF-830233—1) Study of an F center in molten KCl.** Parrinello, M.; Rahman, A. (Trieste Univ. (Italy). Ist. di Fisica Teorica; Argonne National Lab., IL (USA)). May 1983. Contract W-31-109-ENG-38. 13p. NTIS, PC A02/MF A01. Order Number DE83014736.

From Conference on Monte Carlo methods in quantum problems; Orsay, France (9 Feb 1983).

It is shown that a discretized version of Feynman's path integral provides a convenient tool for the numerical investigation of the properties of an electron solvated in molten KCl. The binding energy and the pair correlation functions are calculated. The local structure around the solute electron appears to be different from that of an F center in the solid.

44359 **(CONF-830710—4) Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures.** Bakale, G.; Beck, G. (Case Western Reserve Univ., Cleveland, OH (USA). Dept. of Radiology; Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Strahlenchemie). 1983. Contract AC02-78EV04746. 3p. NTIS, PC A02/MF A01. Order Number DE83014654.

From 7. international conference of radiation research; Amsterdam, Netherlands (3 Jul 1983).

To measure electron reactions on a picosecond timescale the investigators developed a picosecond pulse-conductivity technique, which makes use of the electron fine-structure pulses of our LINAC (pulse width 25 vs FWHM) to produce excess electrons and now detects changes in sample conductance under optimum conditions with an instrumental response of 18 ps. This resolution is in agreement with a theoretical estimate. This technique has been successfully applied to study excess electron reactions in solvents covering a mobility range from 0.24 to 100 $cm^2V^{-1}s^{-1}$; extension to lower mobility liquids seem possible.

44360 **(IAEA-R—2581-F) Preparation of permselective membranes by means of radiation induced grafting. Part of a coordinated programme on radiation modified polymers for biomedical and biochemical applications. Final report for the period 1 August 1980 - 31 August 1982.** Lee, C.K. (International Atomic Energy Agency, Vienna (Austria)). Sep 1982. 45p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702087.

Styrene grafting to cellulose acetate membrane was studied to prepare a cellulose acetate reverse osmosis membrane with improved dimensional stability. The combination of cross-linking agents such as divinylbenzene or trimethyl propane triacrylate was found to increase the percentage of grafting. For the grafting of styrene:4-vinylpyridine:benzoyl peroxide mixture to cellulose acetate, the activation energy was determined to be 21.8 Kcal/mole over the range of 55-80°C. The initial rate of grafting in % per hour was proportional to 0.76 power of dose intensities.

44361 **Geometric model of trapped electrons in x-ray irradiated single crystals of rhamnose.** Samskog, P.; Kispert, L.D.; Lund, A. (Chemistry Department, The University of Alabama, Tuscaloosa, Alabama 35486). *Journal of Chemical Physics;* 79: No. 2, 635-638(15 Jul 1983).

A geometrical model for the trapping site of the electron in x-ray irradiated rhamnose is presented. The electron is trapped in an intermolecular site formed by three hydroxyl groups, two on the carbohydrate and one on a water molecule. The trapped electron decays by cleavage of an OH bond and the liberated hydrogen atom abstracts a hydrogen atom from the carbon atom to which the OH group is attached. A hydroxy alkyl radical is thus formed whose site has been determined. The conclusion is that the electron trap is preexisting in the crystal lattice of rhamnose and no reorientation of the dipoles is necessary to stabilize the electron.

44362 **Establishing a reaction model of the irradiated carbon tetrachloride/water system.** Jessel, W. Kiel, Germany; Kiel University (1979). 117p. (In German). Available from the library of Kiel Univ. (Germany, F.R.).

Diss. (D.Sc.).

Quite a number of radicals affecting the whole reaction mechanism up to the end products HCl and CO_2 in a manifold way are to be taken into account when considering the irradiation system CCl_4-H_2O. The simultaneous increase in H^+ ion concentration can be determined by means of conductivity measurements. By varying parameters such as pH-value, temperature and concentration, the effect of radiation dose is studied. Within the overall process, the system CO_2/water as a relaxation system is of particular importance and is given special attention in the thesis. A reaction model of the overall process is established and supplemented by mathematical approximations. These approximations are shown in tables and are compared with data obtained by other authors. (RB).

4007 Radiochemistry And Nuclear Chemistry

REFER ALSO TO CITATION(S) 43309, 43376, 43398, 43874, 44332

44363 **(INIS-mf—7961) Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers.** Sackerer, D. (Muenchen Univ. (Germany, F.R.). Fakultaet fuer Medizin). 29 May 1980. 35p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780881.

Des-AB fibrin monomers are prepared by incubation of fibrinogen with thrombin in the presence of aprotinin and EDTA. Plasma samples of rabbits taken at fixed time intervals show an exponential decrease of radioactivity after incorporation of fibrin monomers prepared by means of ^{125}-I-labelled fibrinogen. The fibrin monomer complexes have been separated from the dimers or the fibrinogen by agarose gel filtration for the determination of radioactivity decrease in the various fractions. The results show a specific curve of degradation of the des-AB fibrin monomer complexes with an interpolated half-time of 13.5 hours. The experiments furthermore showed that these soluble fibrin monomer complexes will dissociate into equal parts of complexes of lower molecular weight and monomeric fibrin subsequent to a temperature increase from 20°C to 37°C. It can be assumed that this dissociation process favourably affects the capability of intravascular fibrin to act as a solubility promoting agent. (orig.).

44364 **(JINR—10-82-158) Automatic information system for nuclear spectrometric experiments.** Bogomolova, E.S.; Brudanin, V.B.; Vylov, Ts.; Grashin, A.F.; Zin'kevich, S.P.; Kapustina, L.L.; Kolobashkin, V.M.; Televinova, T.M.; Tsyganov, A.A.; Shchukin, B.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702215.

Portions are illegible in microfiche products3 refs.; 2 figs.; 6 tabs.

The principle of organization of the three-level information system for nuclear investigations is described. The information system is heterogeneous and has nuclear data bank distributed in different computers. The specific level is oriented to specific range of problems, is based on an appropriate computer, has its local data bank, as well as its discipline of interaction with banks of other levels. A special emphasis is placed upon radionuclide data bank developed on the basis of ENSDF file. The program package which is oriented to batch processing under operation system OS ES is described. Programs from this package allow one to get data on radioactive decay in accordance with user directives and to

output them on a line-printer or on computer-carrier to subsequent use in calculations. The programs described answer the most common needs of users.

44365 Raman spectra of the transplutonium orthophosphates and trimetaphosphates. Hobart, D.E.; Begun, G.M.; Haire, R.G.; Hellwege, H.E. (Tennessee Univ., Knoxville (USA). Dept. of Chemistry; Oak Ridge National Lab., TN (USA)). *Journal of Raman Spectroscopy;* **14**: No. 1, 59-62(Feb 1983).

Raman spectra have been obtained from multimicrogram samples of crystalline transplutonium (americium through einsteinium) orthophosphates. Spectra were also obtained for americium, curium, and californium trimetaphosphates. Assignments of the major Raman bands and confirmation of the compounds' stoichiometry were made by comparison with spectra obtained in previous studies on the lanthanide phosphates. The variation of transplutonium orthophosphate vibrational frequencies as a function of atomic number was found to be smaller in magnitude than that established for the lanthanide orthophosphates.

44366 Generator production of ^{172}Lu from ^{172}Hf for limited nuclear medicine research. Grant, P.M.; Daniels, R.J.; Daniels, W.J.; Bentley, G.E.; O'Brien, H.A. Jr. (Los Alamos National Lab., NM (USA)). *Journal of Radioanalytical Chemistry;* **76**: No. 2, 319-323(1983).

Paper copy only, copy does not permit microfiche production2 refs.

A solvent extraction system has been developed for the separation of ^{172}Lu from its long-lived ^{172}Hf parent. The parent-daughter pair in equilibrium is maintained in a solution of HDEHP, and the heavy lanthanide daughter is extracted into 9M HCl. The separation factor for this generator is approximately 10^4. The rare-earth activity so obtained is proposed for compound labelling research and animal biodistribution studies in nuclear medicine.

44367 Synthesis and characterization of bis(μ-hydroxo)tetraaquadiplutonium(IV) sulfate, $Pu_2(OH)_2(SO_4)_3.4H_2O$, a novel compound containing hydrolyzed plutonium (IV). Wester, D.W. (Argonne National Lab., IL). *Inorganic Chemistry;* **21**: No. 9, 3382-3385(Sep 1982). Contract W-31-109-ENG-38.

$Pu_2(OH)_2(SO_4)_3.4H_2O$(I) has been synthesized by hydrothermal hydrolysis of plutonium(IV) sulfate solution. I forms as reddish orange crystals at 140 +/- 5 °C. Analytical data for Pu(coulometric), SO_4^{2-}(gravimetric), and H_2O(thermogravimetric) are in agreement with theoretical values. X-ray powder diffraction data establish the isomorphicity of I with the Zr, Hf, and Ce analogues. Infrared spectra of I contain the peaks expected for hydroxo, aquo, and sulfato groups. Visible spectra of I are comparable to those for hydrated plutonium(IV) sulfate. Near-infrared spectra of I are reported. Comparisons between tetravalent hydroxsulfate compounds are made.

4008 Combustion, Pyrolysis, And High-temperature Chemistry

44368 (NP—3770185) Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit. Hofman, K.H. (Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Ingenieurwissenschaften). 29 Jun 1981. 168p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83770185.

Portions are illegible in microfiche products; Thesis.

The explosion flame temperatures of selected fuel/air-mixtures (methane, ethane, n-butane, methanol, ethanol, n-propanol) are determined experimentally with a precision of 5.5%-6%, which is remarkably high compared with other methods. In contrast to other publications, which do not take into account the influence of ignition energy, even mixture concentrations have been able to ignite. As a result of the flame temperature measurements, a common flame temperature for n-alkane/air and n-alcohol/air-mixtures does not exist. In the case of the alkanes even an increased initial temperature of 75°C does not result in a common flame temperature. With increasing ignition energy, a significant increase of the maximum flame temperatures is observed for n-alkane mixtures.

44369 Instantaneous Ramanography of a turbulent diffusion flame. Long, M.B.; Fourguette, D.C.; Escoda, M.C.; Layne, C.B. (Department of Mechanical Engineering and Center for Laser Diagnostics, Yale University, New Haven, Connecticut 06520). *Optics Letters;* **8**: No. 5, 244-246(May 1983). Contract AC02-81ER10969.

The first reported instantaneous two-dimensional map of the fuel-gas concentration in a turbulent diffusion flame using quantitative Ramanography is described. Details of the experimental configuration are presented, along with data obtained in both cold flows and turbulent reacting flows.

44370 Soot volume fraction profiles in forced-combusting boundary layers. Beier, R.A.; Pagni, P.J. *Journal of Heat Transfer;* **105**: No. 1, 159-165(Feb 1983). Contract AC03-76SF00098.

A multiwavelength laser transmission technique is used to determine soot volume fraction fields and approximate particle size distributions in a forced flow combusting boundary layer. Measurements are made in diffusion flames of polymethylmethacrylate (PMMA) and five liquid hydrocarbon fuels (n-heptane, iso-octane, cyclohexane, cyclohexene, and toluene) with ambient oxygen mass fractions in the range of 0.23< or ≈Y/sub 0infinity/ < or ≈0.50. Soot is observed in a region between the pyrolyzing fuel surface and the flame zone. Soot volume fraction increases monotonically with Y/sub 0infinity/ , e.g., n-heptane and PMMA are similar with soot volume fractions, f/sub v/, ranging from f/sub v/ ~5 x 10^{-7} at Y/sub 0infinity/ = 0.23 to f/sub v/ ~5 x 10^{-6} at Y/sub 0infinity/ = 0.50. For an oxygen mass fraction the same as air, Y/sub 0infinity/ = 0.23, soot volume fractions are approximately the same as values previously reported in pool fires and a free combusting boundary layer. However, the shape of the f/sub v/ profile changes with more soot near the flame in forced flow than in free flow due to the different y-velocity fields in these two systems. For all fuels tested, a most probable particle radius is between 20 nm and 80 nm, and does not appear to change substantially with location, fuel, or oxygen mass fraction.

42 ENGINEERING

4201 General Engineering

REFER ALSO TO CITATION(S) 45317

44371 (BDX—613-2957) Vapor-phase soldering techniques. Final report. Uthe, E.M. (Bendix Corp., Kansas City, MO (USA)). Jul 1983. Contract AC04-76DP00613. 34p. NTIS, PC A03/MF A01. Order Number DE83015353.

The general process instructions for vapor phase soldering are given. These instructions discuss reflow soldering, rework of discrepant material, and maintenance and calibration of the equipment involved. The requirements for soldering discrete components to thick film conductors is also discussed, along with quality assurance and packaging requirements for those components.

44372 New approaches to the dynamics of nonlinear systems with implications for process and control system design. Ray, W.H. Madison, WI; University of Wisconsin (1981). 23p.

Some strongly nonlinear processes, such as chemical reactors, have sufficiently perverse dynamic behaviour in the open loop that even single input/single output control system design can be very difficult. In this paper, examples of this nonlinear behaviour are presented and some new methods of dynamic analysis discussed. Control system design problems, such as parametric sensitivity, ignition/extinction phenomena, and nonlinear oscillations, are illustrated by example. Some outstanding research problems are discussed.

44373 **Integrated plant control: a solution at hand or a research topic for the next decade.** Morari, M. Madison, WI; University of Wisconsin (1981). 29p. Contract AC02-80ER10645.

The applicability of currently available controller design and tuning techniques to the control of integrated plants is investigated. Deficiencies from a theoretical and a practical point of view are pointed out and directions for future research are given.

4202 Facilities And Equipment

REFER ALSO TO CITATION(S) 43401, 43749, 44372, 44428, 44434, 44493, 44535, 44536, 44554, 44666, 45218, 45253, 45254, 45260, 45290

44374 **(AECB—1184) Radioactive material transport.** White, M.C. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). Oct 1979. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701835.

All movements of radioactive materials in Canada are governed by a comprehensive body of regqlations, both national and international. These regulations are designed to maximize shielding to the public and transport workers, allow for heat dissipation, and to prevent criticality accidents, by prescribing specific packaging arrangements, administrative controls, labelling and storage measures. This report describes in some detail specific requirements and summarizes some incidents that occurred between 1974 and 1978.

44375 **(AECB—1187) Transportation incidents involving Canadian shipments of radioactive material. 1947 - 1978.** Jardine, J.M. (Atomic Energy Control Board, Ottawa, Ontario (Canada)). Jun 1979. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701836.

This paper gives a brief statement of the legislation governing the transportation of radioactive materials in Canada, reviews the types of shipments made in Canada in 1977, and surveys the transportation incidents that have been reported to the Atomic Energy Control Board over the period 1947-1978. Some of the more significant incidents are described in detail. A totAl of 135 incidents occurred from 1947 to 1978, during which time there were 644750 shipments of radioactive material in Canada.

44376 (GSI—82-8, pp 325-339) **Superconducting magnets.** Teng, L.C. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In this paper, we present and discuss superconducting magnets as a mature technology. We will discuss first, the properties of Type II superconductor; second, the designs of dipoles and quadrupoles, the principal types of magnets required for storage rings and beam transfer lines; and finally, the life time of these magnets operating in the high radiation environment next to a fusion reactor.

44377 **(IAE—3371/10) Study on training and mechanical degradation in superconducting magnet models.** Anashkin, O.P.; Varlakhin, V.A.; Kejlin, V.E.; Krivykh, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702094.

8 refs.; 13 figs.

On small model superconducting coils placed in external magnetic field high mechanical stresses proper to large superconducting magnet systems (SMS) have been reproduced. The effect of winding mechanical properties on their training and limiting current values has been investigated. It is confirmed that the winding deformation at helium temperature is of a jump-type nature and accompanied by heat release which cause transition in the normal state. Training and degradation correlation with a non reversible and reversible components of the winding material deformations has been found out. The mechanism training and degradation of superconducting magnets is suggested. This mechanism enables planning possible ways of undesirable phenomena decrease for account of deformation heat release decrease: limiting of possible winding deformations, creation of windings at elastic deformation of which heat release does not exceed a definite critical value (selection of gasket material and conductor insulation etc...) It is shown as well that self-banding either in round or oval windings leads to limiting magnet current increase.

44378 **(INIS-mf—7636) Slip-line field analysis of metal flow during two dimensional forging.** Fenton, R.G.; Khataan, H.A. 1981. 8p. (CONF-811273—38). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780938.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A method of computation and a computer software package were developed for solving problems of two dimensional plastic flow between symmetrical dies of any specified shape. The load required to initiate plastic flow, the stress and velocity distributions in the plastic region of the metal, and the pressure distribution acting on the die are determined. The method can be used to solve any symmetrical plane strain flow problem regardless of the complexity of the die. The accurate solution obtained by this efficient method can provide valuable help to forging die designers.

44379 **(INIS-mf—7643) Optimization of mechanical systems subjected to dynamic loadings.** de Vasconcelos, H.F.; Taylor, S. (Paraiba Univ., Joao Pessoa (Brazil)). 1981. 13p. (CONF-811273—28). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780921.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The optimization of a mechanical system requires the definition of a merit function to be minimized and a set of constraining functions for ensuring the feasibility of the minimum. Those functions are defined by the physical characteristics of the system, whose dynamic behaviour can be predicted by the finite element method, thus requiring a fairly large computer effort, which increases the design costs. A general procedure for dealing wiht those problems is presented.

44380 **(INIS-mf—7651) Lower bounds of collapse loads in axisymmetrical vessels.** Fonseca Neto, J.deD.; Ebecken, N.F. (Piaui Univ., Teresina (Brazil). Dept. de Estruturas). 1981. 10p. (In Portuguese). (CONF-811273—29). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780922.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The rigid-plastic limit analysis of shells of revolution subject to rotationally symmetric loadings, is presented. After assembling the finite elements, the limit analysis program is reduced to a simple application of the non-linear programming technique, where the sequential unconstrained minimization technique (SUMT) is utilized for the statically admissible approach. Lower bounds of the collapse loads are presented and compared with the results described in the literature.

44381 **(INIS-mf—7652) Plastic instability in short tubes with internal pressure.** Blass, A.; Moro, N. (Santa Catarina Univ., Florianopolis (Brazil). Dept. de Engenharia Mecanica). 1981. 11p. (In Portuguese). (CONF-811273—18). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780910.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Corrections are presented to a previous formulation, which becomes more suitable to the analysis of the plastic instability of both short and long tubes. Existing experimental evidence confirms moderately this statement.

44382 **(INIS-mf—7655) Experimental analytical study on heat pipes.** Ismail, K.A.R.; Liu, C.Y.; Murcia, N. (Universidade Estadual de Campinas (Brazil)). 1981. 7p. (In Portuguese). (CONF-811273—20). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780912.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

An analytical model is developed for optimizing the thickness distribution of the porous material in heat pipes. The method

was used to calculate, design and construct heat pipes with internal geometrical changes. Ordinary pipes are also constructed and tested together with the modified ones. The results showed that modified tubes are superior in performance and that the analytical model can predict their performance to within 1.5% precision.

44383 **(INIS-mf—7656) Design concept for vessels and heat exchangers.** Elfmann, W.; Ferrari, L.D.B. (NUCLEN, Rio de Janeiro (Brazil)). 1981. 8p. (CONF-811273—30). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780923.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A design concept for vessels and heat exchangers against internal and external loads resulting from normal operation and accident is shown. A definition and explanation of the operating conditions and stress levels are given. A description of the type of analysis (stress, fatigue, deformation, stability, earthquake and vibration) is presented in detail, also including technical guidelines which are used for the vessels and heat exchangers and their individual structure parts.

44384 **(INIS-mf—7664) Quasi-estatic and dynamic elasto/viscoplastic analysis of plates and shells.** Dinis, L.M.S. 1981. 12p. (In Portuguese). (CONF-811273—32). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780925.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The non-linear quasi-static and dynamic analysis of plates and shells is presented using the finite - element method for spatial discretization and the Central Finite Differences for the integration of the transient dynamic equation. The behaviour of the material is represented by the elasto/viscoplastic model of Perzyna together with approximations of the Von Mises yield surfaces for plates and shells.

44385 (INIS-mf—7666, pp vp) **Criticality calculations for safety analysis.** Vellozo, S.O. (Instituto Militar de Engenharia, Rio de Janeiro (Brazil)). 1981. (In Portuguese). NTIS (US Sales Only), PC A16/MF A01. (CONF-8104185—).

From 2. national meeting of reactor physics; Rio de Janeiro, Brazil (13 Apr 1981).

Criticality studies in uranium nitrate and plutonium nitrate aqueous solutions were done. For uranium compound three basic computer codes are used: GAMTEC-II, DTF-IV, KENO-IV. Water was used as refletor and the results obtained with the different computer codes were analyzed and compared with the 'Handbuck zur Kriticalitat'. The cross sections and the cylindrical geometry were generated by Gamtec-II computer code. In the second compound the thickness of the recipient with plutonium nitrate are used with rectangular geometry and concret reflector. The effective multiplication constant was calculated with the Gamtec-II and Keno-IV library. The results show many differences.

44386 (INIS-mf—7685, pp vp) **Mica nuclear track filters. Production, properties and applications.** Tress, G.; Khan, E.U.; Vater, P.; Werner, W.; Brandt, R. (Marburg Univ. (Germany, F.R.). Fachgebiet Kernchemie); Kadner, M. (Nuklear-Chemie und -Metallurgie G.m.b.H. (NUKEM), Hanau (Germany, F.R.)); Spohr, R. (Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Mica nuclear track filters are produced by irradiation of mica with energetic heavy ions and subsequent etching. The properties of these filters and the air through-put up to 300°C are reviewed. At an industrial plant mica filters are used to filter < 350°C hot waste gas containing radioactive aerosols from the production of reactor fuel elements. After filtration the aerosol particles on the filters are examined by different methods for their properties.

44387 **(JINR—8-82-250) Vessel for cryogenic liquid with a flexible vacuum shell.** Golovanov, L.B.; Zel'dovich, A.G.; Mazarskij, V.L. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702096.

Microfiche only, copy does not permit paper copy reproduction refs.; 3 figs.; 1 tab.

A 100 l vessel for a cryogenic liquid is described. Specific feature of its design is the substitution of a rigid cylindrical shell of vacuum jacket with a flexible shell made of 0.34 mm lawsan foil. Heat influx for a 82 l hydrogen vessel was 65 Wt. Inside the vessel an additional shell is mounted which diminishes 6 fold the heat influx to liquid hydrogen at an instant filling up of a vacuum space with air.

44388 **(JINR-R—10-82-368) Microprocessor control system for large helium liquefier.** Agapov, N.N.; Bazyleva, N.P.; Belushkin, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 6p. (In Russian). (CONF-821179—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702097.

From 2. international symposium on collection and experimental data processing and process control; Versailles, France (3 Nov 1982).

Portions are illegible in microfiche products ref.

A real time system is described for monitoring and control of large helium liquefier. The system is based on a microcomputer in the CAMAC standard. The total number of measured parameters is about 150. About 60 of them are analog signals. The number of controlled devices is about 20. A series of universal algorithms has been developed which provide the operation mode of the liquefier. Information of the operating process is presented on alphanumeric and colour TV displays placed on an operator console.

44389 **(KFK—3268) Investigation of real niobium surfaces by rf-measurements between 12 and 18GHz.** Philipp, A. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kern- und Teilchenphysik; Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Physik). Apr 1982. 67p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83751080.

Diss. (D.Sc.).

Investigations of superconducting Nb-cavities yield temperature and frequency dependences of the surface resistance, which deviate from the predictions of the BCS-theory for homogeneous Nb and strongly depend on surface treatment. Increasing oxygen contamination of the Nb-surfaces leads to an increase of the slope of the frequency dependence R proportional fsup(α) from $\alpha = 1.55$ to $\alpha = 1.86$ and to a decrease of the reduced energy gap Δ(O)/ksub(B)Tsub(c) from 1.92 to 1.76. The different slopes of the frequency dependence are interpreted in terms of a model, in which the square root singularity in the BCS density of states is smeared out to a constant value over an interval 2epsilonΔ(O). The apparent width of this smearing varies from 2epsilonΔ(O) = 0.05 meV to 0.19 meV. The energy gap reduction can to a large extent be explained by the smeared out density of states. In addition the reduction of the critical temperature by dissolved oxygen and the formation of weak superconducting spots at the surface are taken into account. The rf results for differently prepared cavities show a linear correlation between energy gap and width of the smearing of the density of states. Extrapolation to zero smearing yields an undistorted energy gap Δ(O)/ksub(B)Tsub(c) = 1.975, which agrees well with the best result Δ(O) = 1.56 meV from tunneling investigations.

44390 **(KFK-PFT—50) Development of an adaptive control of deep-hole-drilling.** (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekttraegerschaft Fertigungstechnik). Feb 1983. 108p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83751046.

Portions are illegible in microfiche products.

The research report shows the results of development work to construct an operable AC-System for deep-hole-drilling machines carried out by two machine-tool builders, a tool-builder and an University-Institute. Before building the AC-System, it is neces-

sary to start with technological basic researches. First this is the coverage of the tool wear status, the research of possibilities for chip form recognition and its implementation. The Chip-Form Control System, which was developed by the University of Dortmund, was tested in industrial application. The ACC (adaptive control constraint), described in the final report, was designed for a numerically controlled, deep-hole-drilling machine. The control mechanism works by the rotation signal from the main spindle. The main engine current served as the normal size, while the feed engine current was used as pilot signal. The procedures, start, bore, penetrate and restart were well identified by the control mechanism. The method of operation of the control mechanism was proved in many tests in an industrial factory.

44301 **(NP—3770005) Experimental studies on drilling with roller bits in a deep-drilling test bench at a rotational speed of 50 min^{-1} to 150 min^{-1}.** Malbrecht, D. (Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen). 16 Jul 1981. 112p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83770005.

Portions are illegible in microfiche products; thesis.

Maximum drilling speed and minimum cost are the main objects of development in drilling. Laws governing the various drilling parameters have been investigated in a depp-drilling test bench. Qualitative conclusions have been drawn on drilling with roller bits. Quasistatic penetration tests have been carried out for various wedge cuts.

44302 **(NP—3770144) Stability calculations for cylindrical shells and folded systems using the method of finite elements.** Fix, A. (Bochum Univ. (Germany, F.R.). Abt. fuer Bauingenieurwesen). 29 Apr 1980. 226p. (In German). NTIS (US Sales Only), PC A11/MF A01. Order Number DE83770144.

Portions are illegible in microfiche products; Thesis.

In this paper element models, which have proved to be suitable for the description of plates, are presented and extended consequently for the treatment of shells and folded systems. The quality of the new elements is demonstrated with technically relevant and physically sensible structures.

44303 **(SAND—83-1601C) Radiation-hard design principles utilized in CMOS 8085 microprocessor family.** Kim, W.S.; Mnich, T.M.; Corbett, W.T.; Treece, R.K.; Giddings, A.E.; Jorgensen, J.L. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 13p. (CONF-830714—10). NTIS, PC A02/MF A01. Order Number DE83015112.

From 20. IEEE annual conference on nuclear and space radiation effects; Gatlinburg, TN, USA (18 Jul 1983).

A microprocessor family has been designed in radiation-hardened bulk, silicon-gate CMOS and the three main family members are logic emulations of Intel NMOS devices: SA3000, a general-purpose 8-bit central processing unit (CPU) (Intel 8085A); SA3001, a 256 x 8-bit static RAM with two 8-bit I/O ports, one 6-bit I/O port and a timer (Intel 8155/56); SA3002, a 2K x 8-bit ROM with two 8-bit I/O ports (Intel 8355). This paper describes the design principles and methodology used to realize fully static, fully complementary CMOS devices capable of withstanding more than one megarad total dose. These designs are latchup-free and are built on epitaxial substrates using a 3-micron gate length technology. In order to achieve this level of radiation tolerance, the radiation characteristics of the process must be measured and the radiation effects accommodated in all phases of the design.

44304 **Shot noise effect on the nonzero voltage state of the hysteretic Josephson junction.** Ben-Jacob, E.; Bergman, D.J.; Imry, Y.; Matkowsky, B.J.; Schuss, Z. (Institute for Theoretical Physics, University of California at Santa Barbara, Santa Barbara, California 93106). *Applied Physics Letters;* **42**: No. 12, 1045-1047(15 Jun 1983). Contract AC02-78ER04650.

We consider the combined effect of shot and thermal noise on (i) the stationary distribution of fluctuations about the nonzero voltage state of an underdamped hysteretic Josephson junction, and (ii) the noise induced transition rate from the nonzero voltage to the zero voltage state. We find that the distribution is nonsymmetric in that the positive voltage fluctuations are more probable than the negative ones. We also find that the transition rates are larger than those due to thermal noise alone.

44305 **Goniometer attachment for low-speed diamond wafering saws.** Hintz, M.B. (Department of Metallurgical Engineering, Michigan Technological University, Houghton, Michigan 49931). *Review of Scientific Instruments;* **54**: No. 6, 773-774(Jun 1983). Contract AC02-81ER10941.

The construction of a compact, two-axis goniometer that has been designed specifically for use on commonly available low-speed diamond wafering saws is described. The device can be easily attached to practically any back reflection Laue camera and is, therefore, suitable for the orientation and cutting of single crystals parallel to particular crystallographic planes or directions. It is both simple and inexpensive to construct.

44306 **Conductor for a fluid-cooled winding.** Kenney, W.J. (to Dept. of Energy). US Patent 4,384,168. 17 May 1983. Filed date 12 May 1981. vp.

PAT-APPL-262832.

A conductor and method of making the conductor are provided for use in winding electrical coils which are cooled by a fluid communicating with the conductor. The conductor is cold worked through twisting and reshaping steps to form a generally rectangular cross section conductor having a plurality of helical cooling grooves extending axially of the conductor. The conductor configuration makes it suitable for a wide variety of winding applications and permits the use of simple strip insulation between turns and perforated sheet insulation between layers of the winding.

44307 **Brookhaven superconducting power transmission system.** Forsyth, E.B. (Brookhaven National Laboratory, Upton, New York 11973). *Physics Teacher;* **21**: No. 5, 285-291(May 1983).

Results of tests on underground transmission lines made of superconducting materials are given. The cryogenic enclosures needed for the cables are discussed. (AIP)

44308 **Flicker (1/f) noise in tunnel junction DC SQUIDS.** Koch, R.H.; Clarke, J.; Goubau, W.M.; Martinis, J.M.; Pegrum, C.M.; Van Harlingen, D.J. (Department of Physics, University of California, Berkeley, CA). *Journal of Low Temperature Physics;* **51**: No. 1, 207-224(1 Apr 1983). Contract AC03-76SF00098.

We have measured the spectral density of the 1/f voltage noise in current-biased resistively shunted Josephson tunnel junctions and dc SQUIDs. A theory in which fluctuations in the temperature give rise to fluctuations in the critical current and hence in the voltage predicts the magnitude of the noise quite accurately for junctions with areas of about 2 x 10^4 μm^2, but significantly overestimates the noise for junctions with areas of about 6 μm^2. DC SQUIDs fabricated from these two types of junctions exhibit substantially more 1/f voltage noise than would be predicted from a model in which the noise arises from critical current fluctuations in the junctions. This result was confirmed by an experiment involving two different bias current and flux modulation schemes, which demonstrated that the predominant 1/f voltage noise arises not from critical current fluctuations, but from some unknown source that can be regarded as an apparent 1/f flux noise. Measurements on five different configurations of dc SQUIDs fabricated with thin-film tunnel junctions and with widely varying areas, inductances, and junction capacitances show that the spectral density of the 1/f equivalent flux noise is roughly constant, within a factor of three of $(10^{-10}/f)phi^2_0Hz^{-1}$. It is emphasized that 1/f flux noise may not be the predominant source of 1/f noise in SQUIDS fabricated with other technologies.

4203 Lasers

44399 (LA-UR—83-1851) Transient effects and pump depletion in stimulated Raman scattering. Carlsten, J.L.; Wenzel, R.G.; Druehl, K. (Los Alamos National Lab., NM (USA); New Mexico Univ., Albuquerque (USA). Inst. for Modern Optics). 1983. Contract W-7405-ENG-36. 8p. (CONF-830425—32). NTIS, PC A02/MF A01. Order Number DE83014139.

From Society of Photo-Optical Instrumentation Engineers conference; Santa Fe, NM, USA (11 Apr 1983).

Stimulated rotational Raman scattering in a 300-K multipass cell filled with para-H_2 with a single-mode CO_2-pumped laser is studied using a frequency-narrowed optical parametric oscillator (OPO) as a probe laser at the Stokes frequency for the $S_0(O)$ transition. Amplification and pump depletion are examined as a function of incident pump energy. The pump depletion shows clear evidence of transient behavior. A theoretical treatment of transient stimulated Raman scattering, including effects of both pump depletion and medium saturation is presented. In a first approximation, diffraction effects are neglected, and only plane-wave interactions are considered. The theoretical results are compared to the experimental pulse shapes.

44400 (PPPL—2003) Population inversion and gain measurements for soft x-ray-laser development in a magnetically confined plasma column. Suckewer, S.; Skinner, C.H.; Voorhees, D.; Milchberg, H.; Keane, C.; Semet, A. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jun 1983. Contract AC02-76CH03073. 26p. NTIS, PC A03/MF A01. Order Number DE83014917.

We present population inversion and gain measurements from an experimental investigation of possibilities to obtain high gain and lasing action in the soft x-ray region. Our approach to soft x-ray-laser development is based on rapid plasma cooling after the laser pulse by radiation losses, leading to fast recombination and collisional cascade into upper excited levels of CVI, for example, while the lower excited levels depopulate rapidly by radiative transitions, thus creating population inversions and gain. A $\simeq$ 0.5 kJ CO_2 laser was focused onto a target of solid carbon or teflon; or CO_2, O_2, Ne gas, and the resulting plasma confined in a 50 to 90 kG magnetic field. Spectroscopic diagnostics with absolute intensity calibration were used to measure level populations.

44401 (UCRL—53420) Measured stimulated Raman gain in methane. Lopert, R.B. (Lawrence Livermore National Lab., CA (USA)). 2 May 1983. Contract W-7405-ENG-48. 452p. NTIS, PC A20/MF A01. Order Number DE83015201.

Thesis.

This report is about the stimulated Raman effect in methane due to the nu_1 vibration. For various gas pressures between 150 torr and 30 atm, the Raman lineshape function was both experimentally measured and synthesized using a computer model. The stimulated Raman gain was measured by sending a pump laser beam provided by an argon-ion laser and a weak probe beam provided by a tunable dye laser through a cell of methane gas. The stimulated Raman effect caused some of the energy from the pump beam to be transferred to the probe beam. The intensity of the pump beam was low so the gain of the probe beam was on the order of parts per million. A two detector arrangement and a differential amplifier system that had a feedback loop to balance the detectors was constructed to measure the small gains. A detailed description of this detection system that was able to measure gains as small as 0.2 parts per million is provided.

44402 Large-bore copper-vapor lasers: Kinetics and scaling issues. Kushner, M.J.; Warner, B.E. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Journal of Applied Physics;* **54**: No. 6, 2970-2982(Jun 1983). Contract W-7405-ENG-48.

The scaling characteristics of large diameter (6< or =d< or =12 cm) high repetition-rate copper-vapor lasers are investigated using a radially dependent laser-discharge model. Results of the model are verified with experimental data obtained on several devices including an 8-cm-diam 100-W copper-vapor laser. Two effects, penetration of the applied electric field into the plasma and gas heating, which we show are the primary considerations in volumetric scaling, are discussed in detail. Thermal constriction of the discharge resulting from gas heating is prevented by plasma skin effects that allow stable performance at large diameters. These same effects are shown to explain the sequential excitation of the laser levels, resulting in both temporally and spatially dependent behavior of the laser pulse. Projections of output power and light-pulse characteristics are made for lasers up to 12 cm in diameter.

44403 Density and temperature variations in pulsed discharge lasers. Milonni, P.W. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Applied Physics;* **54**: No. 6, 3595-3597(Jun 1983).

Approximate expressions are derived for the density and temperature variations in a pulsed discharge laser. The analysis is specialized to the case of the electron-beam-excited CO_2 laser. In particular, a procedure is suggested for including the refractive index variations in computer codes modeling loaded resonator characteristics of high-power pulsed lasers.

44404 Pulse compression by pulse-stacking in a KrF amplifier. Taylor, M.W.; Goldhar, J. (University of California, Lawrence Livermore National Laboratory, P. O. Box 5508, Livermore, California 94550). *Applied Optics;* **22**: No. 9, 1288-1292(1 May 1983). Contract W-7405-ENG-48.

A laser pulse-compression technique employed to obtain intense pulses ($\sim$1 GW) from an electron-beam-pumped KrF amplifier is demonstrated. This technique consists of time-sequencing and angle-coding separate pulses through the amplifier. The system described uses four pulses for a nominal temporal compression factor of 4. The input vs output temporal pulse shapes and saturation characteristics are demonstrated. Also discussed are the issues of parasitic oscillations, optical cross talk, saturation pulse broadening, and limitations on scaling to larger compression factors.

44405 Analysis of mode locking by synchronous pumping of a gain medium with long decay time. Yasa, Z.A. (Applied Physics and Laser Spectroscopy, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Optics Letters;* **8**: No. 5, 277-279(May 1983). Contract AC03-76SF00098.

Analytic expressions are given to describe the pulse characteristics and the mode-locking regime for the synchronously pumped laser with a radiative lifetime >> cavity round-trip time.

44406 Measurement of laser beam divergence. Falk, J. (University of Pittsburgh, Department of Electrical Engineering, Pittsburgh, Pennsylvania 15261). *Applied Optics;* **22**: No. 8, 1131-1132(15 Apr 1983). Contract W-7405-ENG-48.

A simple technique is described that can determine the far-field laser beam divergence by the propagation of the beam through a birefringent crystal (KDP) and a polarizer-analyzer. This method is even applicable to single pulses from a pulsed laser. (AIP)

44407 Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation. Milonni, P.W.; Ackerhalt, J.R.; Galbraith, H.W. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **50**: No. 13, 966-969(28 Mar 1983).

The problem of a collection of two-level atoms interacting with a single-mode classical electromagnetic field is considered. It is found that the model with an initial population inversion exhibits chaotic behavior that becomes stronger for higher atomic number density. The chaos is characterized by Fourier analysis and the maximal Lyapunov exponent. In the rotating-wave approximation, however, there is no prediction of chaos.

44408 **Future development of high-power solid-state laser systems.** Emmett, J.L.; Krupke, W.F.; Trenholme, J.B. (Lawrence Livermore National Laboratory, Livermore, CA USA). *Soviet Journal of Quantum Electronics (English Translation);* 13: No. 1, 1-23(Jan 1983).

The future trends in the development and design of high-power pulsed solid-state laser systems are considered in relation to the laser fusion problem. Attention is concentrated on neodymium-doped glass lasers, but the possibility of using other media, particularly ion-doped crystals, is also discussed. New methods for pumping such systems (both existing and future) are reviewed. Ways and means of tuning the emission wavelengths, methods for increasing the average power, and characteristic features of the design of systems as a whole are also discussed.

44409 **(UCRL-Trans—11887) Second-harmonic generation in a neodymium laser by crystalline powders of organic compounds.** Tikhonov, E.A.; Shpak, M.T. Translated from *Ukrainskii Fizicheskii Zhurnal (Russian Edition)* ; 17: No. 2, 190-201(1972). Contract W-7405-ENG-48. 21p. NTIS, PC A02/MF A01. Order Number DE83015342.

Portions are illegible in microfiche products.

Investigating new nonlinear optical materials is an important task in the problem of expanding the range of practical applications of quantum-electronic methods and devices. Moreover, the physical information acquired through the study of second harmonic generation (SHG) makes it possible to explain some macroscopic optical properties of crystals, and in particular to determine the coefficients. In recent reports attention has been focused on the mechanism responsible for the value of the nonlinear coefficients of some organic compounds. This paper contains the results of a search for new nonlinear optical materials among the vast group of complex organic dyes and certain compounds used as the parent substances for dye synthesis.

4204 Heat Transfer And Fluid Flow

REFER ALSO TO CITATION(S) 43290, 43731, 43803, 43853, 43862, 43863, 44087, 44382, 45280

44410 **(INIS-mf—7628) Two-phase flow and heat transfer in cavities.** de Socio, L.M.; Gaffuri, G. (Politecnico di Torino (Italy)). 1981. 8p. (CONF-811273—39). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780894.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Slow recirculating flows of suspensions of small solid particles contained in rectangular enclosures are dealt with. The pertinent equations follow the model of Saffman and Drew for small density differences between the continuum and the dispersed phase. Analytical and numerical solutions are obtained in two situations, i.e. the natural convection between two isothermal vertical walls and the recirculation induced by a sliding plate.

44411 **(INIS-mf—7629) Transients in pipes.** Marchesin, D.; Paes-Leme, P.J.S.; Sampaio, R. (Pontificia Univ. Catolica do Rio de Janeiro (Brazil)). 1981. 13p. (CONF-811273—3). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780895.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The motion of a fluid in a pipe is commonly modeled utilizing the one space dimension conservation laws of mass and momentum. The development of shocks and spikes utilizing the uniform sampling method is studied. The effects of temperature variations and friction are compared for gas pipes.

44412 **(INIS-mf—7630) Transfer coefficients for plate fin and elliptical tube heat exchangers.** Saboya, S.M.; Saboya, F.E.M. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. Tecnologico de Aeronautica). 1981. 10p. (CONF-811273—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780896.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

In order to determine transfer coefficients for plate fin and elliptical tube exchangers, mass transfer experiments have been performed using the naphthalene sublimation technique. By means of the heat-mass transfer analogy, the results can be converted to heat transfer results. The transfer coefficients were compared with those for circular tube exchangers and the comparison revealed no major differences. This is a positive outcome, since the use of elliptical tubes may reduce substantially the pressure drop, without affecting the transfer characteristics.(Author).

44413 **(INIS-mf—7632) Thermal response of a mass of fluid to a constant cooling rate applied on its boundaries.** Robillard, L.; Vasseur, P. (Ecole Polytechnique, Montreal, Quebec (Canada)). 1981. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780898.

A numerical method has been developed to study the thermoconvective heat transfer occuring in a rectangular cavity whose boundaries are subjected to a constant rate of decrease in temperature. The problem considered is basically transient. However, if the cooling process is maintained long enough, a quasi-steady is reached for which heat fluxes across boundaries and temperature differences between interior points and boundaries becomes independent of time.

44414 **(INIS-mf—7633) Thermal resistance of a convectively cooled plate with applied heat flux and variable internal heat generation.** Venkataraman, N.S.; Cardoso, H.P.; de Oliveira Filho, O.B. (Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)). 1981. 12p. (CONF-811273—7). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780899.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The conductive heat transfer in a rectangular plate with non-uniform internal heat generation, with one end convectively cooled and a part of the opposite end subjected to external heat flux is considered. The remaining part of this end as well as the other two sides are thermally insulated. The governing differential equation is solved by a finite difference scheme. The variation of the thermal resistance with Biot modulus, the plate geometry, the internal heat generation parameter and the type of profile of internal heat generation is discussed.

44415 **(INIS-mf—7634) Slow forced and free convection in inclined channels.** de Socio, L.M.; Misici, L.; Polzonetti, A. (Politecnico di Torino (Italy)). 1981. 10p. (CONF-811273—8). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780900.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Mixed convection at low Reynolds numbers in tilted rectangular channels of intermediate aspect ratios is dealt with. A laminar flow enters into an inclined enclosure whose upper plate is adiabatic whereas a constant heat flux is supplied to the bottom plate. The analytic solution of the linearised problem is first obtained. Subsequently the numerical solution of the pertinent equations is carried on by a computer's time saving iterative procedure.

44416 **(INIS-mf—7639) Simulation of thermal transients using CSMP.** Konuk, A.A.; Paula, H.M. (Universidade Estadual de Campinas (Brazil)). 1981. 10p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780902.

A mathematical model has been developed to simulate thermal transients for the Hellum Loop of the 'Instituto de Pesquisas Energeticas e Nuleares', Sao Paulo. The model is based on the energy equation applied to the various components of the loop. The non-linear system of first order ordinary differential equation and algebraic equations has been solved using IBM's 'System/360-Continuous System Modeling Program-CSMP'. The model has been tested satisfactory with experimental results.

44417 (INIS-mf—7640) Design of heat exchangers by numerical methods. Konuk, A.A.; Bantista Filho, B.D. (Universidade Estadual de Campinas (Brazil)). 1981. 7p. (In Portuguese). (CONF-811273—11). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780903.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Differential equations describing the heat tranfer in shell - and tube heat exchangers are derived and solved numerically. The method of ΔT sub(lm) is compared with the proposed method in cases where the specific heat at constant pressure, Cp and the overall heat transfer coefficient, U, vary with temperature. The error of the method of ΔT sub (lm) for the computation of the exchanger lenght is less than + 10%. However, the numerical method, being more accurate and at the same time easy to use and economical, is recommended for the design of shell-and-tube heat exchangers.

44418 (INIS-mf—7641) Photothermoelastic simulation of transient thermal stresses. Burger, C.P.; Miskioglu, I. (Iowa State Univ. of Science and Technology, Ames (USA). Engineering Research Inst.). 1981. 11p. (CONF-811273—12). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780904.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

An experimental solution is presented for the quasistatic problem of the transient thermal stresses around elliptical holes near the edge of a plate. Empirical equations are obtained for the maximum stresses, in dimensionless terms, that arise when the boundary temperature changes suddenly.

44419 (INIS-mf—7644) Davies-Taylor equation for the fluidization bubble. Kinrys, S.; Qassim, R.Y. (Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia). 1981. 11p. (CONF-811273—13). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780905.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The Davies-Taylor equations is justified for the steady rise of a spherical cap gas bubble in a gas - fluidized bed. Starting from the jump conditions at the bubble surface, it is shown that both the fluid and the total pressures should be constant there. Further, it is demonstrated that the relevant velocity to be used in the Davies-Taylor equation is the absolute bubble velocity in the gas - fluidized bed case, whilst it is the bubble velocity relative to the liquid fluidizing velocity in the case of a liquid-fluidized bed.

44420 (INIS-mf—7645) New method to calculate pressure drop and shell-side heat transfer coefficient in a shell-and-tube heat exchanger. Baptista Filho, B.D.; Konuk, A.A. (Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Metalurgia Nuclear). 1981. 10p. (In Portuguese). (CONF-811273—14). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780906.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

A new method to calculate pressure drop (Δp) and shell-side heat transfer coefficient (h sub(c)) in a shell-and-tube heat exchanger with segmental baffles is presented. The method is based on the solution of the equations of conservation of mass and momentum between two baffles. The calculated distributions of pressure and velocities given respectively, Δp and h sub(c). The values of Δp and h sub(c) are correlated for a given geometry whit the shell side fluid properties and flow rate. The calculated and experimental results agree very well for a U-Tube heat exchanger.

44421 (INIS-mf—7647) Utilization of axisymmetrical models in the description of the fluctuating temperature field and in the calculation of turbulent thermal diffusivity. Cintra Filho, J.deS. (Sao Carlos Univ. (Brazil)). 1981. 10p. (In Portuguese). (CONF-811273—15). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780907.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The fluctuating temperature field structure is studied for the case of turbulent circular pipe flow. Experimentally determined integral length scales are used in modeling this structure in terms of axisymmetric forms. It is found that the appropriate angle of axisymmetry is larger than the one for modeling the large scale velocity structure. The axisymmetric model is then used to examine the validity and the prediction capability of the Tyldesley and Silver's non-spherical eddy diffusivity theory.

44422 (INIS-mf—7650) Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle. Graca, M.C.; Ballve, H.; Fernandez y Fernandez, E.; Carajilescov, P. (Pontificia Univ. Catolica do Rio de Janeiro (Brazil)). 1981. 8p. (In Portuguese). (CONF-811273—17). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780909.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The friction factor and the static pressure distributions, in the axial and transversal directions, in the wall of the hexagonal duct, enclosing a seven wire-wrapped rod bundle, were experimentally measured, using an air opened loop. The Reynolds numbers are the range 10^3 - $5x10^4$. The friction factors are compared to existing correlations. The static pressure distributions show that the static pressure is not hydrostatic in the cross section of the flow.

44423 (INIS-mf—7653) Free convection between horizontal cylinders in water at low temperature. Vasseur, P.; Robillard, L.; Shekar, B.C. (Ecole Polytechnique, Montreal, Quebec (Canada)). 1981. 10p. (CONF-811273—19). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780911.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The effect of density inversion on two-dimensional laminar natural convection heat transfer of cold water enclosed between two horizontal concentric cylinders is approached by a numerical method. This investigation is carried out in order to study the inversion of flow patterns caused by the maximum density of water at 4°C. Numerical solutions are obtained for cylindrical enclosure with size parameter A ranging from 2.2 x 10^6 to 4.3 x 10^9, gap ratio B from 0.11 to 0.8. The temperature of the inner cylinder is maintained at T sub(i) = 0°C while temperatures of the outer cylinder T sub(o) are varied from 2 to 12°C.

44424 (INIS-mf—7659) Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above. Akinsete, V.A.; Bello-Ochende, F.L. (Lagos Univ. (Nigeria). Dept. of Mechanical Engineering). 1981. 10p. (CONF-811273—21). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780913.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Steady-state numerical results for the solution to the nonlinear thermal problem of combined free and forced laminar convection in inclined rectangular channels with constant but unequal surface temperature are presented for an incompressible, viscous fluid whose Prandtl number, Pr = 0.73. Fluid properties are assumed constant, except for density variations with temperature. Maximum values exist for the mean friction factor, Nusselt and Stanton numbers when the inclination to the horizontal lies between 30° and 60° for a given Archimedes number, Ar. Also, for any given inclination a unique solution exists when Ar = 0,50.

44425 (INIS-mf—7660) Transfer coefficients for turbulent flow between parallel plates. Vetterle, J.F.; Fernandes, E.C. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). 1981. 10p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780914.

Average transfer coefficients in the turbulent forced convection entrance region between parallel plates, with asymmetrical conditions of the concentration profile, were determined experimentaly with the Naphthalene Sublimation Technique. In accordance with the analogy between heat and mass transfer, the tests correspond to a heat-transfer problem with uniform surface tem-

perature at one plate and the other insulated. The Reynolds number ranges from 10900 to 91700.

44426 **(INIS-mf—7662) Calculation of two-dimensional thermal transients by the finite element method.** da Fontoura Rodrigues, J.L.A.; de Barcellos, C.S. (Brasilia Univ. (Brazil)). 1981. 10p. (In Portuguese). (CONF-811273—23). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780915.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The linear heat conduction through anisotropic and/or heterogeneous matter, in either two-dimensional fields with any kind of geometry or three-dimensional fields with axial symmetry is analysed. It only accepts time-independent boundary conditions and it is possible to have internal heat generation. The solution is obtained by modal analysis employing the finite element method under Galerkin formulation.

44427 **(INIS-mf—7663) Applications of alternating direction methods to the solution of the heat conduction equation, with source, and in transient state.** de Oliverira Barroso, A.C.; Alvim, A.C.M.; Gebrin, A.N.; dos Santos, R.S. (Comissao Nacional de Energia Nuclear.de Brasil, Rio de Janeiro). 1981. 12p. (In Portuguese). (CONF-811273—24). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780916.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

Various types and variants of alternating direction methods. (ADM), were applied to the solution of the time-dependent heat conduction equation, with source, in regions with axial simmetry. Among the basic ADM's, the alternating direction explicit was the one which performed better. An exponential transformation coupled to the ADE seems to be the variant with greater potential, especially if used with a variable time step scheme.

44428 **(JINR-R—8-81-770) Hydrodynamic characteristics of a horizontal channel on the helium two-phase flow motion.** Mamedov, I.S.; Miklyaev, V.M.; Pryanichnikov, V.I.; Filippov, Yu.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1981. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702093.

Portions are illegible in microfiche products1 refs.; 4 figs.; submitted to the journal J. Eng. Phys.

Experimental data are presented on the pressure drop accompanying the helium two-phase flow motion in a horizontal channel made of stainless steel (5.03x0.21 mm and 2.0 m long) under the adiabatic conditions and with heat addition. The obtained results are compared with the data available on vertical and coil channels. The comparison is characterized by a significant distinction both in quality and quantity respects.

44429 **(NUREG/CR—3363-Vol.1) Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 1. Main report and Appendices A-D.** Evans, D.G.; Webb, S.W.; Chen, J.C. (Lehigh Univ., Bethlehem, PA (USA). Inst. of Thermo-Fluid Engineering and Science). Jun 1983. 195p. (TS—831-1-Vol.1). NTIS, PC A09/MF A01 - GPO $6.00. Order Number DE83902887.

To supplement the very limited steady-state data available, experiments have been run with quench fronts propagating slowly up into a tubular test section and measurements of all heat flux, wall temperature, and nonequilibrium vapor temperature as functions of distance beyond the quench front were obtained. Since the time required for the quench front to propagate a few millimeters corresponded to many fluid residence-time, transient convective heat tranfer theory indicates that the thermal data thus obtained are quasi-steady state. The significant experimental findings indicates a zone of two-phase fluid in thermodynamic equilibrium near the CHF location where the vaporization source intensity (Γ) is relatively high. This is followed by a far zone of rapidly developing non-thermodynamic equilibrium two-phase fluid where the source intensity drops off to a relatively low magnitude.

44430 **(NUREG/CR—3363-Vol.2) Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 2. Appendix E.** Evans, D.G.; Webb, S.W.; Chen, J.C. (Lehigh Univ., Bethlehem, PA (USA). Inst. of Thermo-Fluid Engineering and Science). Jun 1983. 334p. (TS—831-2-Vol.2). NTIS, PC A15/MF A01 - GPO $7.50. Order Number DE83902888.

Tabulated are 579 sets of data obtained from 118 experimental runs with quench fronts propagating slowly up into a tubular test sections. Data include wall heat flux, wall temperature, and nonequilibrium vapor temperature. Also given are data on mass flowrate, inlet quality, test section pressure, and void fraction. (LEW)

44431 **(PNL-SA—9501) Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model.** Kreid, D.K.; Hauser, S.G.; Johnson, B.M. (Pacific Northwest Lab., Richland, WA (USA)). 9 Apr 1981. Contract AC06-76RL01830. 31p. (CONF-811101—34). NTIS, PC A03/MF A01. Order Number DE83015299.

From Winter annual meeting of the American Society of Mechanical Engineers; Washington, DC, USA (15 Nov 1981).

An approximate analytical model is described that may be used to calculate the rates of heat transfer and evaporation from the surface of a wet finned heat exchanger. The model is analogous to the conventional expression for convective heat transfer. However, the driving potential is an enthalpy difference instead of a temperature difference. The overall heat-transfer coefficient can be computed in the usual manner using a simple transformation of variables. The value of the model is that wet heat-exchanger performance can be estimated accurately using dry performance data.

44432 **(PNL-SA—9530) Investigation of combined heat and mass transfer from a wet heat exchanger. Part 2. Experimental results and operational characteristics of heat exchangers in dry/wet operations.** Hauser, S.G.; Kreid, D.K.; Johnson, B.M. (Pacific Northwest Lab., Richland, WA (USA)). Apr 1981. Contract AC06-76RL01830. 32p. (CONF-811101—33). NTIS, PC A03/MF A01. Order Number DE83015431.

From Winter annual meeting of the American Society of Mechanical Engineers; Washington, DC, USA (15 Nov 1981).

This second part of a two-part paper summarizes the experimental evaluation of a plate finned heat exchanger both with and without the surface wetted by a flowing film of water. The results indicate an increase in heat transfer during wet operation of two to five times over that of dry operation for the same meteorological conditions. The deluge model is shown to accurately predict the wet performance using an experimentally determined deluge film coefficient and the dry performance characteristics.

44433 **(SFB—80/TE/196) Resistance characteristics of rough open channels with a rigid boundary.** Ranga Raju, K.G.; Webel, G.; Schatzmann, M. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Sonderforschungsbereich Ausbreitungs- und Transportvorgaenge in Stroemungen). Jul 1981. 40p. Available from Fachinformationszentrum Energie, Physik, Mathematik, Karlsruhe (Germany, F.R.).

The present state of art of the resistance of rigid-boundary channels is reviewed. Essentially the characteristics of channels with gravel roughness and such artificial roughnesses as cubes, strips and unsymmetrical triangular elements are discussed. Emphasis is placed on the mean-flow characteristics. Attention is drawn to the modifications in the logarithmic velocity profile caused by the presence of large-scale roughness. The variation of a roughness parameter like the equivalent sandgrain roughness with changes in size, shape, concentration and arrangement of roughness elements is discussed. The method of using this information to attain a given value of the resistance coefficient in physical models of rivers is also described.

44434 **(SLAC-PUB—3143) Heat flow in a He II-filled fin.** Warren, R.P. (Stanford Linear Accelerator Center, CA (USA)). Jun 1983. Contract AC02-76ER03075;AC03-76SF00515. 5p. (CONF-830841—1). NTIS, PC A02/MF A01. Order Number DE83015086.

From Cryogenic engineering conference and international cryogenic materials conference; Colorado Springs, CO, USA (15 Aug 1983).

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The problem of heat flow in He II is solved for the boundary conditions specified by a fin. The influence of diameter, length, Kapitza conductance, and temperature on the heat carrying capacity of an externally cooled, circular He II filled channel with zero net mass flow and of negligible wall thermal resistance is shown. (LEW)

44435 **(ZfK—484) Heat pipe - a heat conductor of high efficiency.** Kuenstler, K. (Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)). Oct 1982. 17p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83751082.

Portions are illegible in microfiche products.

The heat pipe is a special device for the heat transfer. A closed evacuated pipe contains in its capillary system (wick) a little quantity of a vaporizable liquid. The heat is transported by evaporation and condensation of this liquid. On this base efficient can be developed heat transfer systems. They are suitable for the transport of large heat quantities as well as for the realization of isotherm work chambers and work surfaces. The heat pipe opens up principally new possibilities for the construction of highly effective heat transfer systems. Research and development work on the heat pipe has been carried out above all in the U.S.S.R., U.S.A. and F.R.G. In these countries heat pipes are much successfully used for heat transfer on much fields of technology.

44436 **Intrinsically irreversible thermoacoustic heat engine.** Wheatley, J.; Hofler, T.; Swift, G.W.; Migliori, A. (University of California, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of the Acoustical Society of America;* **74**: No. 1, 153-170(Jul 1983).

Certain thermoacoustic effects are described which form the basis for a heat engine that is intrinsically irreversible in the sense that it requires thermal lags for its operation. After discussing several acoustical heating and cooling effects, including the behavior of a new structure called a "thermoacoustic couple," we discuss structures that can be placed in acoustically resonant tubes to produce both substantial heat pumping effects and, for restricted heat inputs, large temperature differences. The results are analyzed quantitatively using a second-order thermoacoustic theory based on the work of Rott. The qualities of the acoustic engine are generalized to describe a class of intrinsically irreversible heat engines of which the present acoustic engine is a special case. Finally the results of analysis of several idealized intrinsically irreversible engines are presented. These suggest that the efficiency of such engines may be determined primarily by geometry or configuration rather than by temperature.

44437 **Radiative heat transfer in fibrous insulations: Part 1: Analytical study.** Tong, T.W.; Tien, C.L. (Department of Mechanical Engineering, University of Kentucky, Lexington, Kentucky 40506). *Journal of Heat Transfer;* **105**: No. 1, 70-75(Feb 1983).

The purpose of this work is to develop models for predicting the radiant heat flux in lightweight fibrous insulations (LWFI). The radiative transport process is modeled by the two-flux solution and the linear anisotropic scattering solution of the equation of transfer. The radiative properties of LWFI consistent with these solutions have been determined based on extinction of electromagnetic radiation by the fibers. Their dependence on the physical characteristics of fibrous insulations has been investigated. It has been found that the radiant heat flux can be minimized by making the mean radius of the fibers close to that which yields the maximum extinction coefficient. The results obtained in this study are useful to those concerned with the design and application of LWFI.

44438 **Radiative heat transfer in fibrous insulations: Part II: Experimental study.** Tong, T.W.; Tang, Q.S.; Tien, C.L. (Department of Mechanical Engineering, University of Kentucky, Lexington, Kentucky 40506). *Journal of Heat Transfer;* **105**: No. 1, 76-81(Feb 1983).

Two experiments have been conducted to study radiative heat transfer in light-weight fibrous insulations (LWFI). The spectral extinction coefficients for a commercial LWFI have been measured via transmission measurements, and a guarded hot plate apparatus has been used to measure the radiant heat flux as well as the total heat flux in the insulation. The experimental results are compared with the theoretial values calculated according to the analytical models are useful in Part I of this paper. The comparisons reveal that the analytical models are useful in giving representative values for the radiative properties of typical LWFI. However, only qualitative agreements have been obtained for the heat transfer results.

44439 **Correlation theory for steady natural convective heat transport in horizontal annuli.** Boyd, R.D. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Heat Transfer;* **105**: No. 1, 144-150(Feb 1983). Contract AC04-76DP00789.

A correlation theory for two-dimensional natural convective heat transport data for horizontal annuli of arbitrary cross section has been developed and applied to two configurations: (i) concentric circular cylinders and (ii) annuli formed by an inner hexagonal cylinder and an outer circular cylinder. Also embodied in the theory is the capability to predict local as well as mean heat transfer. Thermal boundary conditions of the form T'x/sup m/ can be accommodated. Data for the Rayleigh number (Ra/sub R/) varied from 10 to 10^7, Prandtl number (Pr) varied from 0.7 to 3100, and varied from 0.5 to 2.0. Even with these large variations, the present correlation theory collapses all the experimental data for the annular geometries to a single line. The physical problem appears to be completely specified by a single equation when the following is known: thermal boundary condition (i.e., m), the fluid (i.e., Pr), the aspect ratio, the Rayleigh number, and the geometry. This work demonstrates that the present theory is applicable to annuli of arbitrary cross section, and therefore the theory will be extended to include curvature effects and axisymmetric geometry.

4205 Materials Testing

REFER ALSO TO CITATION(S) 43753, 44120, 44446

44440 **(CONF-8305103—1) Developments in eddy-current computation with eddynet.** Turner, L.R.; Lari, R.J. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 4p. NTIS, PC A02/MF A01. Order Number DE83014717.

From COMPUMAG conference on the computation of electromagnetic fields; Genoa, Italy (30 May 1983).

The eddy-current computer code EDDYNET has been modified to incorporate $2\pi/n$ symmetry, specification of current-crossing boundaries, a polar mesh generator, calculation of current density and temperature rise, calculation of forces and torques, a mesh with multiple sheets, and fields and fluxes from filamentary current rings. It has been successfully applied to find the forces and temperature rise of a conducting flat plate in a pulsed magnetic field and the currents in a hollow conducting torus.

44441 **(CONF-8305103—2) Survey of eddy-current programs.** Lari, R.J.; Turner, L.R. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 5p. NTIS, PC A02/MF A01. Order Number DE83014734.

From COMPUMAG conference on the computation of electromagnetic fields; Genoa, Italy (30 May 1983).

Portions are illegible in microfiche products.

This paper describes the results of a literature search and questionnaire survey of eddy-current computer programs. The capabilities of each program are compared in the first four tables and the references listed. Results of a recent questionnaire survey of researchers working in this area are given.

44442 **(GKSS—82/E/44) Fatigue crack growth from blunt notches.** Rhodes, D. (GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)). 1982. 28p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750921.

A number of methods have been proposed, by which the formation and early growth of fatigue cracks at blunt notches may be predicted. In this report, four methods are compared - i.e. analysis of the crack tip plastic deformation, the cyclic contour integral, ΔJ, the strain in a critical volume of material, and the notch root plastic strain range. It is shown that these approaches have fundamental elements in common, and that all are compatable with linear elastic fracture mechanics. Early results from a continuing experimental programme are reported.

44443 **(UCID—19838) University of California participation in the CIRP round robin of residual-stress measurement.** Shackelford, J.F. (California Univ., Davis (USA)). 8 Jul 1983. Contract W-7405-ENG-48. 24p. NTIS, PC A02/MF A01. Order Number DE83014777.

The University of California, Davis, in conjunction with the Lawrence Livermore National Laboratory has participated in an international round robin testing program for residual stress measurement by x-ray diffraction. The comparative results among five participating laboratories were quite good with scatter in the data being less than +- 10%.

4206 Safety Engineering

44444 **(IFE/KR/E—16) Denpendency models and probability of joint events.** Oerjasaeter, O. (Institutt for Energiteknikk, Kjeller (Norway)). Aug 1982. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750789.

Probabilistic dependencies between components/systems are discussed with reference to a broad classification of potential failure mechanisms. Further, a generalized time-dependency model, based on conditional probabilities, for estimation of the probability of joint events and event sequences is described. The applicability of this model is clarified/demonstrated by various examples. It is concluded that the described model of dependency is a useful tool for solving a variety of practical problems concerning the probability of joint events and event sequences where common cause and time-dependent mechanisms are involved.

44445 **(IFE/KR/E—82/004) Suggestions concerning the use of failure data.** Oerjasaeter, O. (Institutt for Energiteknikk, Kjeller (Norway)). Sep 1982. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750786.

The problem of sparse system-specific failure data and limited relevance of generic experience is discussed, and some suggestions are set forth, concerning the use of generic failure data for estimation/choice of prior distributions. Further, a method for estimating maximum likelihood of distribution parameters is exemplified.

44446 **(NP—3770195) Contribution to improving reliability assessments of mechanical structural components requiring a high degree of safety using weighted Monte Carlo simulation.** Kutter, R. (Liege Univ. (Belgium). Lab. de Physique du Batiment). 4 Dec 1981. 180p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83770195.

Portions are illegible in microfiche products; Thesis.

Physical theories to inquire lifetime and reliability of mechanical structures or components under multiscale random stress do not exist. Today those dates were examinated e.g. in development of aircrafts and motorcars by fatigue-testing of original components and sections during long terms. Knowing the distributions of stress and material-parameters the same testing is to be realized simulatic:ary on highspeed computers. This study gives methods to reduce the necessary computation time to attending ones even to proof reliability up to $R = 1 \cdot 10^{-9}$. These methods were of Monte-Carlo-Simulation with weighted parameters and respect to life-history.

44447 **(UCID—19752) Grounding guidelines: practical examples for power systems at LLNL.** Jensen, B.; Epps, R. (Lawrence Livermore National Lab., CA (USA)). 1 Jul 1983. Contract W-7405-ENG-48. 48p. NTIS, PC A03/MF A01. Order Number DE83015174.

Guidelines are given for equipment grounds to protect personnel and equipment from electrical hazards. The importance of equipment grounding to safety is briefly described. Several electrical grounding schemes are described and recommended for utility power systems. The ground fault return conductor, ground fault circuit interruptor, and ground fault receptacle are discussed. Equipment grounding conductors in research power systems are described and illustrated, including how they are installed. (LEW)

4207 Vacuum Engineering

44448 **(KEK—81-2) Proceedings of the 3rd meeting on ultra high vacuum techniques for accelerators and storage rings, Tsukuba, January 24-25, 1980.** Horikoshi, G. (ed.). (National Lab. for High Energy Physics, Oho, Ibaraki (Japan)). Apr 1981. 126p. (In Japanese). (CONF-800194—). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780994.

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

Individual items in scope for the data base are processed separately.

44449 **Conversion of liquid-nitrogen traps to mechanical refrigeration.** Coggiola, M.J.; Leon, R.L.; Scally, R.L. (Molecular Physics Laboratory, SRI International, Menlo Park, California 94025). *Review of Scientific Instruments;* **54**: No. 7, 894-895(Jul 1983).

A simple technique is described which allows a reservoir-type liquid-nitrogen trap to be converted to continuous operation with a closed-cycle mechanical refrigeration system. The conversion requires no internal modification to the trap and uses only standard commercial refrigeration components. Using 502 refrigerant as the working fluid, temperatures of -52 °C are readily achieved in a trap operating above a 6-in. water-cooled baffle and oil diffusion pump.

4208 Electronic Circuits And Devices

REFER ALSO TO CITATION(S) 43742, 44397, 44627, 44628

44450 **(BDX—613-2920) Effect of CTBN composition on the properties of clear and filled epoxy adducts.** Young, D.A.; Smith, C.H. (Bendix Corp., Kansas City, MO (USA)). Mar 1983. Contract AC04-76DP00613. 8p. (CONF-830809—2). NTIS, PC A02/MF A01. Order Number DE83008315.

From Symposium on phenolics revisited; Washington, DC, USA (28 Aug 1983).

A carboxyl-terminated butadiene/acrylonitrile (CTBN)/epoxy resin adduct, used to encapsulate electronic devices, was studied to improve its quality and reliability. The average physical and mechanical properties of the amine-cured product were obtained by testing 16 batches of adduct prepared from 13 separate lots of CTBN. It was found that by using a CTBN with a higher acrylonitrile content (or one in which the chemical structure includes carboxyl groups in the chain backbone, in addition to end termination), a clear, soluble liquid adduct that does not separate in storage or transit could be prepared. These materials also produced clear epoxy castings and filled potting compounds with improved impact, flexural, compressive, and tensile strengths.

44451 (DOE/RA/50156—T1) Determination of threshold and maximum operating electric stresses for selected high voltage insulations. Task II. Investigation of oil-filled paper insulated cables. Progress report No. 3. CTL-83-016. Sosnowski, M.; Eager, G.S. Jr. (Cable Technology Labs., Inc., New Brunswick, NJ (USA)). Jun 1983. Contract AC02-80RA50156. 44p. NTIS, PC A03/MF A01. Order Number DE83014657.

This report covers investigations of threshold voltage of oil-impregnated paper insulated cables. Experimental work was done on model cables specially manufactured for this project. The cables were impregnated with mineral and with synthetic oils. Standard impulse breakdown voltage tests and impulse voltage breakdown tests with dc prestressing were performed at room temperature and at 100°C. The most important result of this study is the finding of very high level of threshold voltage stress for oil-impregnated paper insulated cables. This threshold voltage is approximately 2.5 times higher than the threshold voltage of crosslinked polyethylene insulated cables.

44452 (NUREG/CR—3122) Potentially damaging failure modes of high- and medium-voltage electrical equipment. Hoy, H.C. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 91p. (ORNL/NSIC—213). NTIS, PC A05/MF A01 - GPO. Order Number DE83015034.

The electrical equipment failures of both nuclear and nonnuclear public utilities were reviewed. Those failures that could pose an additional problem to surrounding and connected equipment were defined. The literature was searched; utilities, repair shops, and large electrical equipment users were contacted for failure information. The data were reviewed in detail, and failure modes were determined. Sample cascade failures are discussed. The failure rate of electrical equipment in utilities is historically quite low. Nuclear plants record too few failures to be statistically valid, but failures that have been recorded show that good design usually restricts the failure to a single piece of equipment.

44453 (SAND—83-0414) Insulation-resistance measurements of coated and uncoated printed wiring boards. Jennings, C.W. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 36p. NTIS, PC A03/MF A01. Order Number DE83015457.

Insulation resistance (IR) was measured between narrow spaced conductors on different types of printed circuit boards with and without polymer coatings. Measurement environments consisted of thermal cycling in a humid environment per MIL-STD-202/106, and room temperature with 5 to 100 percent relative humidity (R.H.). The variability of the IR of test patterns both within a board and between boards with the same coating, and the lack of consistent resistivity values, suggest that the measured IR in these environments is not inherent to the materials, but is related to the contaminates present on and in the materials. There was little difference in IR for different conformal coatings or laminate types or sources. Although the IR was found to increase significantly when a board was conformally coated, there was no coating type tested which could ensure a high IR. Porcelain enamel and multiwire boards had lower IR than conventional circuit boards. An association was observed between low IR and the tendency for dendritic filament formation between conductors in a 100 percent R.H. environment.

44454 (UCRL—88536) Avalanche devices state-of-the-art. Pocha, M.D. (Lawrence Livermore National Lab., CA (USA)). 12 Jan 1983. Contract W-7405-ENG-48. 11p. (CONF-830145—1). NTIS, PC A02/MF A01. Order Number DE83014841.

From ARO workshop on solid state switches for pulsed power; Tamarron, CO, USA (12 Jan 1983).

Portions are illegible in microfiche products.

Some uses and characteristics of avalanche transistors are briefly listed, and some observations derived from studying avalanche transistors are given, as well as plans for future work. It is found that surface topology does not seem to affect the rise time, that increasing area of the diffusions does not affect the current handling capability, that the breakdown voltage divided by the rise time is almost constant, and that series connection of transistors does not degrade rise time. (LEW)

44455 (UCRL—88639) Small and light thyratron grid driver. Ross, R.I. (Lawrence Livermore National Lab., CA (USA)). 1 Jul 1983. Contract W-7405-ENG-48. 6p. (CONF-830621—39). NTIS, PC A02/MF A01. Order Number DE83014941.

From IEEE power electronics specialists conference; Albuquerque, NM, USA (6 Jun 1983).

Thyratrons are typically used to provide pulsed energy to lasers. A design is reported based on a line type pulser but making use of a high-voltage switching power supply to provide a reliable, compact, fault-tolerant unit. This pulser is referred to as the thyratron grid driver. During pulser operation the switching power supply cannot keep the pulser thyratron in conduction after the pulse forming network has been discharged, thus eliminating latch-up problems. (LEW)

44456 Alternative methods for determining the electrical conductivity of core samples. II. Lytle, R.J. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Review of Scientific Instruments;* **54**: No. 7, 871-874(Jul 1983). Contract W-7405-ENG-48.

Electrode configurations are described that can be used in measuring the electrical conductivity of a core sample from a borehole in ground. The use of these configurations is warranted for laboratory measurements simulating the pressure and fluid flow conditions encountered at depth within the earth. Three particular electrode configurations are illustrated with numerical results depicting their relative merits.

44457 Improved system for measuring the writing speed of sweeping image cameras. McQueen, R.G. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Review of Scientific Instruments;* **54**: No. 7, 875-878(Jul 1983). Contract W-7405-ENG-36.

A new system has been developed for determining the writing speed of sweeping image cameras. In this system the time intervals between light pulses from the image of a small objective slit as seen by a photomultiplier tube through a pair of slits at the object plane are measured by a time interval meter. Several features of this system allow the writing speed of an individual measurement to be determined to better than a tenth of a percent so that very precise corrections can be determined for nonideal behavior of the camera's optical system.

44458 Transmit versus receive gains for microwave dish antennas. Richter, J.L. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Applied Physics;* **54**: No. 6, 3528-3533(Jun 1983). Contract W-7405-ENG-36.

For the microwave dish antennas, the antenna gain when transmitting can be different, and is usually less, than that of the same antenna when receiving. The theory of the far field transmit and receive antenna gains is developed for the classical dish as well as for the general case. Aperture functions are derived for use in the integral form of the Fraunhofer diffraction equation. Both the aberration effects of the dish and the angular distribution of the feed are taken into account. Calculations of transmit and receive antenna patterns and gains are compared for the f/1 classical dish for various amounts of feed spillover.

44459 Effect of oxidizing and reducing atmospheres at elevated temperatures on the electrical properties of zinc oxide varistors. Sonder, E.; Austin, M.M.; Kinser, D.L. (Solid State Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Journal of Applied Physics;* **54**: No. 6, 3566-3572(Jun 1983). Contract W-7405-ENG-26.

Voltage—current characteristics have been measured for varistors that have been heated in reducing or oxidizing gases. Reducing environments produced large decreases in the leakage resistance. However, the original varistor characteristics could be restored by subsequent heating in oxidizing ambients. The oxygen

partial pressure below which degradation occurred is 100 Pa at 800 °C. Degradation by reducing ambients occurred at much lower temperatures (150—500 °C) than did restoration of the varistor characteristics by oxidizing ambients (500—700 °C). An explanation of the observed behavior is proposed.

44460 **Thermally induced switching and failure in p-i-n RF control diodes.** Chaffin, R.J. (Sandia National Labs., Albuquerque, NM 87185). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Microwave Theory and Techniques;* 30: No. 11, 1944-1947(Nov 1982). Contract AC04-76DP00789.

This paper measures and analyzes a thermally induced, breakdown-like effect in p-i-n RF switching diodes. The effect is found to be due to thermally generated carriers increasing the I-region conductivity and loss. This is a positive feedback situation which, with increasing power levels, eventually causes the diode to switch to a low-impedance state. In the low-impedance state, further increases in temperature have a negative feedback effect on the absorbed power and hence this mode is stable with a very large hysteresis effect. Unfortunately, the high temperatures encountered in the low-impedance mode (about 400°C) have a detrimental effect on diode reliability. The threshold power at which switching to this mode occurs can be increased somewhat by reverse biasing the diode or improving its heat sink.

4210 Combustion Systems

REFER ALSO TO CITATION(S) 43224, 43257, 43471, 44013, 44061, 44093

44461 **(CW-WR—76-015.49A) Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979.** (Curtiss-Wright Corp., Wood-Ridge, NJ (USA). Power Systems Div.). 1979. Contract AC21-76ET10417. 52p. (FE—1726-49A). NTIS, PC A04/MF A01. Order Number DE82004275.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Additional testing of the small gas turbine/pressurized fluidized bed (SGT/PFB) Technology Unit that has been accomplished. The new 3-stage hot gas cleanup system evaluation indicates improvements are required. Modification to the first and second stage cyclones are in process. A 150-hour endurance/baseline test on the Rover gas turbine engine was completed. The Pilot Plant design continues. However PFB structural design awaits further technology rig testing to establish final definition of hot gas cleanup system. The procurement of long lead raw materials and of engineering drawings for material handling equipment continues.

4220 Underground Engineering

REFER ALSO TO CITATION(S) 43972

44462 **Multiple fracturing of boreholes by using tailored-pulse loading.** Swift, R.P.; Kusubov, A.S. *Society of Petroleum Engineers of A.I.M.E. (American Institute of Mining, Metallurgical and Petroleum Engineers), Paper;* 22: No. 6, 923-932(Dec 1982).

A laboratory experiment was developed to study the effects of pressurizing boreholes of rock samples with tailored pulses at intermediate loading rates. The experiment focused on ascertaining the loading conditions needed to initiate multiple-fracture growth from a borehole. Experiments were performed under controlled loading conditions with borehole pressures ranging from 10 to 100 MPa, loading rates from 1 to 100 MPa/ms, and pulse durations on the order of from 1 to 50 ms. The initial conditions of samples were varied to include dry, quasidry, and fully saturated states along with pressure confinement of the samples up to 50 MPa. Observations on samples of a medium-porosity sandstone showed that the degree of multiple fracturing is quite sensitive to the condition of the borehole as well as to the loading rate and appears strongly influenced by transient pore-pressure effects.

4230 Marine Engineering

REFER ALSO TO CITATION(S) 43196

4240 Pollution Control Equipment

REFER ALSO TO CITATION(S) 43216, 43287, 43541

44463 **(INIS-mf—7685, pp vp) Bipolar current probe and its application in electrostatic precipitators for diagnosis of back discharge severity.** Masuda, S. (Tokyo Univ. (Japan). Dept. of Electrical Engineering). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

As the parameters of expressing the severity of back discharge, the degraded value of the field intensity, E, and the positive and negative ionic current densities, J+ and J-, are proposed, based on the charging and charge-neutralization processes in the bi-ionized field. Then, a bipolar current probe for measuring J+ and J- is described with its probe theory and some of the measuring results. Finally, the experimental verifications of the relationships holding between the charge and performance degradation factors and the probe-measured values of J+ and J- are presented. Although the laboratory results cannot immediately be extended to the practical plants, the bipolar current probe seems to provide one of the useful means for diagnosis of back discharge severity.

4250 Power Cycles

REFER ALSO TO CITATION(S) 44123

44464 **(DOE/ET/15426—T25) R & D for improved efficiency small steam turbines. Final technical report. Phases I and II.** (Northern Research and Engineering Corp., Woburn, MA (USA)). 28 Feb 1983. Contract AC03-79ET15426. 268p. NTIS, PC A12/MF A01. Order Number DE83013483.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A nominal 700-hp, Radial Inlet Steam Turbine (RIT) has demonstrated that small units of this type can nearly double existing machine efficiencies. A shaft efficiency of 80 percent (90 percent Thermal), as predicted, was attained during verification tests. The ultimate goal of this cost-shared program was to further reduce reliance on foreign oil imports by establishing and fielding a family of fuel efficient, small (500 to 5000 hp) steam turbines. The design parameters of the prototype unit tested were established based on an extensive market survey of competing equipment in the USA. Further, potential energy savings were predicted on an appraisal of the degree to which this family of enhanced-efficiency, small turbines would penetrate the market over the next decade. It was concluded from surveys that 61 percent of the present user population would replace existing units if the pay-back period was no more than 3.6 years. Projected first-costs, determined by detailed design evaluation, showed pay-backs less than one year for all sizes. If this replacement market, and a realistic (conservative) percentage of new purchases were captured, the resultant energy savings represent the equivalent of 5 million bbl/year by the mid to latter 1980's.

44465 **(DTH-LET-NE—82-1(Pt.1)) Notes in turbomachinery. Pt. 1. Design examples.** Qvale, B.; Bothmann, V. (Danmarks Tekniske Hojskole, Lyngby. Lab. for Energiteknik). 1981. 182p. NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750758.

Portions are illegible in microfiche products.

Part I contains examples of the design of a number of different pieces of turbomachinery. There is a progression in the degree of difficulty of the various examples starting from the first section. The design examples in Part I are based on the Basic Equations and the Basic Physical Phenomena of Part III and on the Experimental and Theoretical Methods and Techniques of Part II. The notes

have been developed to satisfy the needs in the introductory and advanced cources on turbomachinery at the Technical University of Denmark. In their present form the notes have to be considered as a draft.

44466 (DTH-LET-NE—82-1(Pt.2)) Notes in turbomachinery. Pt. 2. Experimental and theoretical methods. Qvale, B.; Bothmann, V. (Danmarks Tekniske Hojskole, Lyngby. Lab. for Energiteknik). 1981. 124p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83750759.

Portions are illegible in microfiche products.

A number of procedures may be used in the fluid dynamic and thermodynamic design of turbomachinery. These distinguish themselves from each other by the steps by which the empiricism is introduced into the design. For axial turbomachinery this determines the relationship to experimental information. That is: "What type of cascade information is needed for this design procedure" or "What type of design procedure can make best use of the available cascade information". Short outlines of three methods: the Blade-Element Method, Blade-Passage Method and the Work-Done Factor Method are given. A row of blades in an axial turbomachinery stage may be designed according to the blade-element method. The blade-passage method represents a further refinement of the blade-element theory in that the requirement of rotational symmetry is relaxed. The effects of boundary layers, secondary flows, wakes and whatever else one could imagine in a compressor are included in the work-done factor. The relationships between losses and performance parameters are discussed. Cascade testing with its theoretical background and dimensional analysis are presented in detail.

44467 (DTH-LET-NE—82-1(Pt.3)) Notes in turbomachinery. Pt. 3. Basic relationships. Qvale, B.; Bothmann, V. (Danmarks Tekniske Hojskole, Lyngby. Lab. for Energiteknik). 1981. 165p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750760.

Portions are illegible in microfiche products.

The basic laws governing the mechanics and the thermodynamics of fluids are examined with special emphasis on the Basic Laws governing the Performance of Turbomachinery and their Application to Control Volumes. Some special derivations are presented. Some of them have been included while they are of importance to the analysis of flow problems in general, such as "Euler's Equation" or Bernoulli's Equation". Others have been included while they illuminate some special aspects of flow through rotodynamic machinery such as "Euler's Turbine Equation" or "The Production of Power in Turbomachine Requires Unsteady Flow". The most important flow phenomena are introduced, such as boundary layers and wakes and their consequences such as separation, secondary flows, skewed velocity profiles and mixing losses. There are presented phenomena that are not normally thought of as being of a basic nature. They are, however, very basic to turbomachinery as it is difficult to envision a turbomachine in which these are not found. The performance of every turbomachine depends virtually on these phenomena. These are slip, deviation and incidence.

43 PARTICLE ACCELERATORS

REFER ALSO TO CITATION(S) 43836

44468 (GSI—82-8) Proceedings of the symposium on accelerator aspects of heavy ion fusion. (Gesellschaft fuer Schwerionenforschung . m.b.H., Darmstadt (Germany, F.R.)). 1982. 635p. (CONF-820338—). NTIS (US Sales Only), PC A99/MF A01. Order Number DE83750205.

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

These proceedings contain the articles presented at the named symposium. These concern research programs on heavy ion fusion reactions, linear accelerators, storage rings, beam transport and focusing, beam-target experiments, and target physics. Separated abstracts were prepared for the articles in these proceedings.

4301 Design, Development, And Operation

44469 (CTA-EAV-NT—011/82) Implementation, of the superfish computer code in the CYBER computer system of IEAV (Instituto de Estudos Avancados) in Brazil. Silva, R. da. (Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). Oct 1982. 50p. (In Portuguese). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702098.

The computer code SUPERFISH has been implemented in CYBER - IEAV computer system. This code locates eletromagnetic modes in rf resonant cavities. The manipulation of the boundary conditions and of the driving point was optimized. A computer program (ARRUELA) was developed in order to make easier SUPERFISH analysis of the rf properties of disc-and-washer cavities. This version of SUPERFISH showed satisfactory performance under tests.

44470 (GSI—82-8, pp 132-149) INS RFQ linac 'LITL'. Nakanishi, T.; Ueda, N.; Arai, S.; Hattori, T.; Katayama, T.; Tokuda, N.; Hirao, Y. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

An RFQ Linac, named LITL (Lithium Ion Test Linac) is in course of construction at INS in order to develop the technology for the acceleration of ion in a low-beta region. The geometry of the RFQ structure has been designed to accept a 5 keV/u ion beam with a charge to mass ratio of 1/7 approx. equal to 1, and optimized at 100 MHz. An output energy of 138 keV/u is attained in a 122 cm vane length. The cavity, excited through a single loop coupler, has been designed on basis of experiences and results of cold cavity experiments. The LITL test facilities including an ion source, transport system, and diagnostic devices are in preparation.

44471 (GSI—82-8, pp 161-180) Berkeley research program on ion induction linacs for inertial fusion. Keefe, D.; Rosenblum, S.S. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Currently under study, is a driver example that relies on exactly sixteen beams from start to finish, and avoids the extra dilution that inevitably accompanies either beam-merging or beam-splitting.

44472 (GSI—82-8, pp 199-210) SNQ linac - a technological step towards a fusion driver. Vetter, J.E. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Main parameters and design arguments of the SNQ linac are discussed and compared to the HIBALL-linac design. The SNQ linac is found a valuable technological prestep which would give a solid basis of experience for construction and operation of accelerator systems with multimegawatt beams.

44473 (GSI—82-8, pp 275-277) Summary of the linac discussion group. Jameson, R.A. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The RFQ scaling relationship, aspects of funneling, equipartioning, the RF coaxial structure, costing, beam loading, experimental programs, the energy spread, and problems requiring further work are briefly summarized.

44474 (GSI—82-8, pp 448-453) Use of a heavy-ion synchrotron facility for ICF studies. Mueller, R.W. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

A dedicated heavy ion accelerator for high temperature experiments or ablation studies is an expensive tool for a special pur-

pose, which will require high confidence that it will perform successfully. Existing or committed machines should be reviewed to see how they can be used to check the physical models of the target interaction, and so contribute to establishing confidence in the overall concept. At the same time, these experiments will require innovations in accelerator physics relevant to heavy ion fusion scenarios. In this paper we do such an analysis for SIS 12, a heavy ion synchrotron under consideration at GSI.

44475 (IPPCZ—244, pp 105-106) **Numerical simulation of collective ion acceleration.** Hintze, W. (Akademie der Wissenschaften der DDR, Berlin. Zentralinstitut fuer Elektronenphysik). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

44476 (JINR—9-82-339) **Head model of SILUND-20 linear induction accelerator.** Dolbilov, G.V.; Petrov, V.A.; Petrov, V.A.; Sarantsev, V.P.; Sumbaev, A.P.; Fateev, A.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702112.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 6 figs.

The head model of the collective accelerator injector of SILUND-20 linear induction electron accelerator with the 50 Hz cycle repetition frequency is described. Two accelerating sections are able to create the accelerating field with the 4.5-5 kV/cm intensity. The modulator supplying the accelerating sections operates at one TGH1-2500/50 tiratron and forms the 600 kV intensity pulses, with the 30-40 ns duration at the 800 A beam current. The focusing system forms longitudinal magnetic field with the 2-3 kOe intensity. At the output after two accelerating sections, the electron beam with the 800 A current at 50 Hz frequency has been obtained. The non-uniformity of magnetic field at axis does not exceed 6%. The transmission coefficient on the accelerating road exceeds 90%.

44477 (JINR—9-82-416) **Magnetic system for investigation of the orbit expansion effect on the electron model of a ring cyclotron.** Zaplatin, N.L.; Novikov, D.L.; Samsonov, E.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702114.

7 refs.; 6 figs.; 2 tabs.

The parameters of the additional magnetic system of the electron model of ring cyclotron are presented. This system is used for investigation of the closed orbit expansion effect on this accelerator. Magnetic system is divided to 4 windings for creation of the definite law of 8th magnetic field harmonic and 11 winding for compensation of first and second harmonics. The magnetic measurement results of main and lowest harmonics in the presence of that system and its possibilities for compensation of the beam coherent oscillations are described.

44478 (NIIEFA-P-K—0564) **Electric strength and probability of breakdown of high-voltage insulation of nanosecond accelerators.** Pecherskij, O.P.; Chetvertkov, V.I. (Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1982. 35p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702126.

Microfiche only, copy does not permit paper copy reproduction3 refs.; 6 figs.

Problems of calculation of electric strength and probability of breakdown of high-voltage insulation of nanosecond accelerators are considered. Normal and Vabulle distributions are used to calculate the breakdown probability. The Vabulle integral distribution taking into account pulse shape electric field distribution and gaps between electrodes, is obtained. Examples of effective time, effective area and probability of breakdown calculation are considered. Technique for experimental data processing to determine the parameters of formulas, describing electric strength and probability of breakdown of high-voltage insulation is developed.

44479 (SLAC/AP—5) **Single-bunch beams for BC-75.** Sodja, J.; Clendenin, J.E.; Erickson, R.A.; Miller, R.H. (Stanford Linear Accelerator Center, CA (USA)). Jun 1983. Contract AC03-76SF00515. 3p. NTIS, PC A02/MF A01. Order Number DE83014762.

On June 8, 1983, a beam consisting of a single S-band bunch was transported through the linac into the beam switchyard (BSY) and analyzed in the C-line (Beamline 27) at 30 GeV. The C-line toroid 2712 measured an intensity of approximately 2 x $10^9 e^-$/pulse. The exact intensity was uncertain due to the limited response time of the toroid for fast, single-bunch beams. However, the linear Q intensity monitors (Lin Q) showed the transmission of the beam through the linac between Sectors 2 and 30 to be fairly flat with an intensity of 3 x $10^9 e^-$/pulse in the final 19 sectors. The CID Faraday cup, which is located adjacent to the Gun Lin Q, was used to check the calibration of the Lin Q.

44480 (TRI-PP—83-45) **TRIUMF kaon factory.** Bryman, D. (British Columbia Univ., Vancouver (Canada). TRIUMF Facility). May 1983. 3p. (CONF-830339—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902880.

From Theoretical symposium on intense medium energy sources of strangeness; Santa Cruz, CA, USA (19 Mar 1983).

A kaon factory, using TRIUMF as an injector, could provide beams of kaons, neutrinos and other particles 100 to 1000 times more intense than are available at existing machines in the 30 GeV range. Consequently experimental opportunities would arise for new studies involving CP violation, rare kaon decays and fundamental neutrino interactions.

4302 Beam Dynamics, Field Calculations, And Ion Optics

REFER ALSO TO CITATION(S) 44513, 44549, 44557, 44560

44481 (GSI—82-8, pp 108-115) **Space-charge and emittance blowup in linacs.** Jameson, R.A. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Recent work leading to better understanding of beam emittance under space-charge conditions in linear transport and accelerating channels is reviewed. Some practical considerations are outlined for minimizing emittance growth by properly matching the input beam, including equipartitioning the energy balance, and by avoiding certain areas of tune-shift.

44482 (GSI—82-8, pp 116-126) **GSI Wideroe experiments.** Klabunde, J. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

For the first time a Wideroe structure was operated at the space charge limit. High intensity He-ions have been accelerated in the Unilac Wideroe. The experimentally found space charge limit and transverse emittance growth rates for different input conditions are reported and compared with results of the analytical approximation formulas and numerical computer simulations.

44483 (GSI—82-8, pp 127-131) **RFQ development at Los Alamos.** Wangler, T.P.; Crandall, K.R.; Stokes, R.H. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The basic principles of the radio-frequency quadrupole (RFQ) linac are reviewed and a summary of past and present Los Alamos work is presented. Some beam-dynamics effects, important for RFQ design, are discussed. A design example is shown for xenon and a brief discussion of low-frequency RFQ structures is given.

44484 (GSI—82-8, pp 181-198) **Multi-dimensional computer simulation of intense beams.** Hofmann, I.; Bozsik, I. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The present work presents results obtained with a Cray 1 computer for 2 1/2-dimensional simulation (assuming r-z geometry) applied to: stationary beams; containment in a long 'bucket', end effects bunch compression; influence of bunch shapes that lead to nonlinear self-forces propagation of perturbations; end effects, finite wall resistivity.

44485 (GSI—82-8, pp 211-223) **Beam dynamics in the HIBALL linear accelerators.** Pabst, M. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The HIBALL linear accelerator is a high current and high brightness accelerator for heavy ion fusion. For this accelerator a beam dynamical design is made in linear approximation. From storage ring and final focusing considerations very small emittances are required at the end of the linear accelerator. Therefore particular considerations are made to avoid effects which cause emittance growth.

44486 (GSI—82-8, pp 224-240) **Funneling of heavy ion beams.** Bongardt, K.; Sanitz, D. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The funneling of heavy ion beams can be achieved by first bending the beams by septum magnets towards the common axis, and then deflecting them onto the axis by rf-deflector elements with time varying electric field strength. The main properties of these deflection elements are discussed, especially the increase of the transverse emittance. As an example beam envelopes are shown for funneling two 100 mA, 1.7 MEV/N Bisup(+2) beams into one 108 MHz Alvarez accelerator.

44487 (GSI—82-8, pp 241-247) **Remark on coupled motion and equipartitioning.** Mueller, R.W. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

For better understanding of longitudinal-transverse coupling effects, especially of the role of coupling terms or of equipartitioning, it is useful to have simple physical pictures, or models, available. In developping such a picture, we also have to learn about some basic properties of the electric potential of a strong-focusing channel which are important for space-charge transport. The pictures make transparent what equipartitioning means.

44488 (GSI—82-8, pp 248-254) **Notes on RFQ beam current as a function of vane voltage, sparking limit, aperture and frequency.** Junior, P.; Deitinghoff, H.; Halfmann, K.D. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Vane voltage and aperture determine maximum beam currents in the RFQ. The ratio is limited by sparking. In this paper Kilpatrick's formula is discussed in respect to enhancement factors, where modulated cylinders as RFQ electrodes are considered. Relation between maximum beam current, aperture, voltage, linac length, transverse phase advance are exemplarily demonstrated with Cssup(1+) fusion linac designs for 9.04 and 13.56 MHz.

44489 (GSI—82-8, pp 255-274) **Hollow beam concept for producing intense beams.** Krejcik, P. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In this paper the main building blocks of the hollow beam concept are described, as well as how they fit together to form a system. The advantages of the hollow beam geometry in high current ion sources, transport, focusing and acceleration are discussed. In particular, a new form of a continuous focusing linear accelerator is described.

44490 (GSI—82-8, pp 308-317) **Bunching of intense beams.** Rees, G.H. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Factors to be considered are: Heavy Ion RF linac and debuncher parameters, fusion target requirements, betatron stacking in the storage rings, transverse and longitudinal space charge effects and instabilities, bunch compression systems, crossing of betatron resonances, transverse and longitudinal emittance dilution effects, final transport to the fusion target.

44491 (GSI—82-8, pp 362-371) **Space charge problems in final beam transport, bunching and focusing.** Hofmann, I.; Bozsik, I. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In the area of transport of high-current beams from the accelerator to the target the following problems have been considered important. (a) conditions for stable transport over long distance in quadrupole channels (b) final bunching during transport to the target of non-parabolic bunch shapes with longitudinal-transverse coupling (c) design of final focusing systems in the presence of space charge. Here we present the results of computational work on these topics, which was performed in the context of the HIBALL accelerator scenario. The examples presented primarily deal with enhanced space charge effects due to doubly charged ions, as assumed in the first version of HIBALL. An important conclusion of this work is that space charge effects in final transport and focusing are now rather well-understood and have not become a matter of concern.

44492 (GSI—82-8, pp 372-375) **Simulation of the longitudinal dynamics of a cold bunched beam.** Haber, I. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The simulations described here were performed with a one-dimensional computer code. Use of the single dimension relaxes the number of particles necessary to achieve a given statistical fluctuation level. It is also possible, by simulating a zero temperature nonlinear system, to remove the fluctuation problem.

44493 (IFVE-OUNK—82-109) **Analysis of factors effecting superconducting dipole field homogeneity.** Balbekov, V.I.; Portugalov, Yu.I.; Tkachenko, L.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702099.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 4 figs.; 6 tabs.

The aim of the investigations was the solution of the problem of the choice of the superconducting (SC) dipole cross section and study on the effect of main sizes of the dipole cross section and magnetic properties of the dipole elements on the magnetic field. Recommendations for the choice of the SC dipole cross section shape are given so as to get a homogeneous magnetic field in the working region. Tolerances for the main sizes of the dipole cross section are given together with the estimates of the influence of the magnetic properties of the elements on magnetic field characteristics.

44494 **(JINR—9-82-188) Experiments on the orbit expansion effect.** Glazov, A.A.; Dmitrievskij, V.P.; Zaplatin, N.L.; Kol'ga, V.V.; Kochkin, V.A.; Novikov, D.L.; Onishchenko, L.M.; Samsonov, E.V.; Shishlyannikov, P.T. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702108.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 6 figs.

Results of experimental research of the effect of closed orbit expansion in the electron model of the isochronous ring cyclotron are described. Amplitudes of coherent and incoherent oscillations of the accelerated beam were reduced to 4-5 mm with special efforts. Employment of the internal high-frequency injector and the use of the first turn optics permitted to obtain the bunches of accelerated beam of about 0.07-0.35 ns (1-5 deg) duration. The dependences of the expansion orbit current versus accelerating voltage on dees, steep slope of the magnetic field variation, accelerating phase and their parameters are investigated. For use of extraction system with 0.5 mm septum one can expect the extraction coefficient close to 99.5%.

44495 **(JINR—9-82-214) Position of the magnetic median surface in the magnet of the JINR synchrophasotron.** Zabolotin, V.P.; Isaev, A.S.; Perfeev, V.N.; Fedukov, S.V.; Sherstyanov, D.I.; Tsarenkov, A.P.; Yalovoj, I.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702109.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 3 figs.; 9 tabs.

Information is presented on the position of the magnetic median surface on the quadrants of the synchrophasotron magnet for a field of 230 Gs on the base of the present measurements and of those performed in 1960. The amplitude and position of first harmonics of distortion of the magnetic median surface and the beam orbit in the vertical plane for a field of 230 Gs are compared to the 1960 data. The coincidence is shown of the results of measurements of the position of the beam orbit in the vertical plane obtained by two independent methods: by means of magnetic measurements and peak-up electrodes. It is shown that distortions in the position of the magnetic median surface in a field interval of 230-650 Gs were to a sufficient extent corrected in 1969. The results are presented of correcting distortions and the influence of operating correction on an accelerated beam.

44496 **(JINR—9-82-283) Approach for calculations of the parameters of iion beams based on the paraxial equation.** Dietrich, Yu.; Kozlowski, Z.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702110.

Microfiche only, copy does not permit paper copy reproduction refs.; 5 figs.; 2 tabs.

An approach for calculations of the ion beam parameters based on the paraxial equation is studied. A system of difference equations has been obtained, which accounts for the optical properties of electrostatic fields (lens effects). Different approximations of the electric field distribution are investigated. The conditions for beams without space charge are studied, which guarantee by a minimum of steps getting results of defined accuracy.

44497 **(JINR—9-82-284) Approach for calculations of the ion optical parameters of beams with high current density.** Dietrich, Yu.; Kozlowski, Z.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702111.

9 refs.

An approach described earlier is used for calculations of the ionoptical parameters including space charge, based on a stepwise approximation of the electrical field. The conditions to obtain the quantitative results with a minimum of approximation steps are defined for beams with considerable space charge.

44498 **(JINR-R—9-82-168) Effect of nonlinear ion space charge forces on the ion beam parameters of a collective accelerator.** Kuznetsov, A.B.; Prejzendorf, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702120.

Portions are illegible in microfiche products0 refs.; 9 figs.

The effect of nonlinear ion space charge forces on the ion beam parameters of the heavy ion collective accelerator is considered. It is shown that the effect of space charge forces of ions accumulated in the electron ring leads to increasing the transverse size of ion beam and to decreasing in ion velocities in the ring. Nonlinear dependence of space charge forces results in more rapid increasing of angle divergence and in the energy spread of ion beam in the drift space as compared with linear dependence of space charge forces. The beam shape on the phase plane changes and its effective emittance increases. The distribution of particles in the beam becomes more uniform to the end of the drift space and dependence of space charge forces approaches the linear one.

44499 **(JINR-R—9-82-175) Computer simulation of radiation instability in relativistic electron rings.** Beloshitskij, P.F.; Perel'shtejn, Eh.A.; Shchinov, B.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702121.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 12 figs.; submitted to the journal Sov. Phys. - Tech. Phys.

The development of radiation instability in a relativistic electron ring is investigated by numerical integration of equations of motion of macroparticles modeling the electron ring. The evolution of distribution function during this process is shown. The rate of increasing energy spread of the ring in nonlinear regime is decreased simultaneously with loss of particles from the ring. The asymptotic distribution of field energy in harmonics is studied. The development of instability of the ring with the initial value of energy spread much greater than threshold value in the linear theory is revealed.

44500 **(JINR-R—11-82-233) Numerical simulation of the motion of a dense electron bunch interacting with a pulsed accelerating field in an inhomogeneous cavity.** Bakhvalov, N.S.; Zhidkov, E.P.; Kadantseva, E.P.; Rubin, S.B.; Serdyukova, S.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702118.

Microfiche only, copy does not permit paper copy reproduction refs.; 8 figs.; 4 tabs.

Results of numerical calculation by the finite-difference method of self-consistent problem of the motion of dense electron bunch in an inhomogeneous cavity is discussed. The pulsed accelerating field with finite storage of energy, excited secondary and induced Coulomb fields affects the bunch. The next problems are considered: in the first case the motion of bunch starts from instable equilibrium in the centre of cavity, in the second it flies into the cavity through the end wall of one of the branch pipes with relativistic initial energy. The energy balance in the dynamic system "bunch plus total electromagnetic field" is considered. The changes in laws of bunch motion for the cases when accelerating field or action of intrinsic field "switch off" are compared.

44501 **(PEP-NOTE—373) Closed orbit produced by an imperfect bump.** Peterson, J.M. (Stanford Linear Accelerator Center, CA (USA)). Jun 1982. Contract AC03-76SF00515. 4p. NTIS, PC A02/MF A01. Order Number DE83014830.

Portions are illegible in microfiche products.

An imperfect orbit bump perturbs the closed orbit througout the storage ring. The magnitude and phase of the perturbation is evaluated in terms of the imperfections of the bump.

44502 **(PEP-NOTE—374) Threshold current for the transverse single-bunch instability in PEP.** Wilson, P.B.; Rivkin, L. (Stanford Linear Accelerator Center, CA (USA)). Aug 1982. Contract AC03-76SF00515. 4p. NTIS, PC A02/MF A01. Order Number DE83014831.

The equation for the threshold current for the transverse single-bunch instability predicted by the two-macroparticle model for a bunch with charge of moving in a storage ring under the influence of a constant dipole wake potential and constant transverse beta-function is given. A preliminary estimate of the fraction of the total dipole impedance exterior to the rf cavities is given. Threshold current values were measured at PEP and fitted to the threshold current equation to determine preliminary values for some of the unknown parameters of the equation. Results are given. (WHK)

44503 **(PEP-NOTE—375) Evaluation of the beam-beam effect in PEP using Myer's simulation program.** Hutton, A. (Stanford Linear Accelerator Center, CA (USA)). Sep 1982. Contract AC03-76SF00515. 15p. NTIS, PC A02/MF A01. Order Number DE83015085.

The program BEAM BEAM written by Steve Myers for the LEP machine at CERN has given encouraging results in the simulation of the beam-beam effect in electron-positron storage rings. It therefore seemed worthwhile to apply the program to PEP with two main intentions. Firstly, to confirm the validity of the program by comparison with experimental data from previous PEP runs and secondly, to search for an improvement in the operating conditions of PEP. Clearly a successful prediction would also enhance the credibility of the program. Results are presented and discussed. (WHK)

44504 **(PEP-NOTE—377) Application of the Green's function method to some nonlinear problems of an electron storage ring. Part II. Checking the method by a quadrupole pertubation.** Kheifets, S. (Stanford Linear Accelerator Center, CA (USA)). Oct 1982. Contract AC03-76SF00515. 12p. NTIS, PC A02/MF A01. Order Number DE83015084.

In the first part of this work I described a general approach to some storage ring problems. The basic concept and the main equations were developed there. The next natural step in this work should be an application of the developed technique to some particular nonlinear problem. Instead I found it useful to apply the method to the case of a field gradient perturbation first. This happened to be plausible not only as a check of the method, but, more importantly, as a way to resolve several troublesome difficulties encountered in subsequent calculations. I consider here the effect of a global gradient error in a weak-focusing machine and the effect of a local gradient error in a strong focusing machine. The distribution function of a particle bunch for a perturbed lattice in these cases can be written explicitly. The expansion of this distribution function as a series of perturbation terms produces the first and the second order corrections to the unperturbed function. From them we calculate then corresponding second moments. A similar expansion of the distribution function is found by the Green's function method. The second moments are found independently with the help of this distribution function. This comparison is done for the first and second order perturbations, i.e., up to the order which is sufficient for subsequent applications.

44505 **(PEP-NOTE—378) Handy impedance formulae, incoherent synchrotron frequency, and head-tail tune shift in PEP.** Bane, K.; Weiland, T. (Stanford Linear Accelerator Center, CA (USA)). Dec 1982. Contract AC03-76SF00515. 5p. NTIS, PC A02/MF A01. Order Number DE83015083.

A simple relation for the higher order mode losses in PEP is derived from computations and in-situ measurements. The self induced wake potential causes a difference between the single particle synchrotron frequency and the measurable coherent dipole frequency. At the operating energy and current the difference is found to be on the order of 500 Hz. From transverse wakefield computations the tune shift of the fundamental head-tail mode is calculated. The accelerating cavities cause a betatron tune shift of about $\Delta\nu = -0.001/mA$ in each plane.

44506 **(SLAC/AP—1) Verification of the SLC wake potentials.** Bane, K.; Weiland, T. (Stanford Linear Accelerator Center, CA (USA)). Jan 1983. Contract AC03-76SF00515. 6p. NTIS, PC A02/MF A01. Order Number DE83015082.

The accurate knowledge of the monopole, dipole, and quadrupole wake potentials is essential for SLC. These wake potentials were previously computed by the modal method. The time domain code TBCI allows independent verification of these results. This comparison shows that the two methods agree to within 10% for bunch lengths down to 1 mm. TBCI results also indicate that rounding the irises gives at least a 10% reduction in the wake potentials.

44507 **(SLAC/AP—2) Application of the Green's function method to some nonlinear problems of an electron storage ring. Part III. Beam-size enhancement due to the presence of nonlinear magnets in a ring.** Kheifets, S. (Stanford Linear Accelerator Center, CA (USA)). Jan 1983. Contract AC03-76SF00515. 21p. NTIS, PC A02/MF A01. Order Number DE83015081.

A perturbation method which allows one to find the distribution function and the beam size for a broad class of storage ring nonlinear problems is described in Part I of this work. In present note I apply this method to a particular problem. Namely, I want to evaluate an enhancement of the vertical beam size of a bunch due to the presence of the ring of nonlinear magnetic fields. The main part of the work deals with sextupole magnets. Formula for the beam size in the presence of octupole fields are also developed to the first order in the octupole strength, although octupole magnets are not widely used in present storage ring designs. This calculation is done mainly because the octupole field has the same symmetry as the beam-beam force for the head-on collision. This will give us the opportunity to compare the conduct of the bunch due to this two types of nonlinear kicks. The general terms of the applicability of the Green's function method is discussed in the first part of this work.

44508 **Multiple sextupole system for the correction of third and higher order aberration.** Crewe, A.V. (to Dept. of Energy). US Patent 4,389,571. 21 Jun 1983. Filed date 1 Apr 1981. vp.

PAT-APPL-249782.

A means is provided for compensating for third and higher order aberration in charged particle beam devices. The means includes two sextupoles with an intermediate focusing lens, all positioned between two focusing lenses.

4303 Auxiliaries And Components

REFER ALSO TO CITATION(S) 44494, 44561, 45002, 45063

44509 **(BNL—33218) Possible use of synchrotrons as post-acceleration boosters for tandems.** Thieberger, P. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 9p. (CONF-8304105—1). NTIS, PC A02/MF A01. Order Number DE83014443.

From 6. international tandem conference; CHESTER, UK (16 Apr 1983).

The recent development of a high-intensity negative-ion source and the demonstration that intense heavy-ion-beam bursts can be accelerated by a large tandem make synchrotrons a possibly attractive alternative when considering different types of tandem-injected heavy-ion-booster accelerators.

44510 **(BNL—33259) BNL AGS - a context for kaon factories.** Littenberg, L.S. (Brookhaven National Lab., Upton, NY (USA)). May 1983. Contract AC02-76CH00016. 16p. (CONF-830339—3). NTIS, PC A02/MF A01. Order Number DE83015052.

From Theoretical symposium on intense medium energy sources of strangeness; Santa Cruz, CA, USA (19 Mar 1983).

Portions are illegible in microfiche products.

Figure 1 shows the Brookhaven site with the AGS-CBA complex highlighted. In this photograph the AGS is dwarfed by CBA and indeed during the past few years future plans for particle

physics at BNL have been dominated by this enormous project. However, very recently interest in future physics use of the AGS has undergone a strong revival. Indeed, since the beginning of this year, two projects for augmenting the AGS have been proposed. Such projects could keep the AGS viable as a research machine for many years to come. In general such schemes will also improve the performance and increase the versatility of the CBA, and so are doubly valuable. It should be kept in mind that in spite of the fact the AGS has been perhaps the most fruitful machine in the history of high energy physics, its full capacities have never been exploited. Even without improvements at least one generation of rare K decay experiments beyond those currently launched seems feasible. Beyond that a major effort at any of the experiments discussed above could take it to the point where it would be limited by intrinsic physics background. To pursue a full program of physics at this level one would want to increase the intensity of the AGS as described. A ten-fold increase in K flux would remove such experiments from the category of all-out technological assaults and render them manageable by reasonably small groups of physicists. In addition, certain other, cleaner experiments, e.g., K/sub L/$^0 \rightarrow e^+e^-$ or $e^+e^-\pi^0$, could be pushed to limits unobtainable at the present AGS. The increased flux would also be welcomed by the neutrino and hypernuclear physics programs. Even experiments which do not at present require higher fluxes would benefit through the availability of purer beams and cleaner conditions.

44511 **(BNL—33272) Ring-magnetron ionizer for polarized negative-ion sources.** Alessi, J.G.; Sluyters, T.; Hershcovitch, A. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 9p. (CONF-830591—3). NTIS, PC A02/MF A01. Order Number DE83014763.

From Polarized ion workshop; Vancouver, Canada (23 May 1983).

It has been realized for some time that the use of the charge exchange reaction of negative deuterium ions with polarized neutral hydrogen yielding neutral deuterium and polarized negative hydrogen ions to produce polarized H^- ions could be very efficient. While intense H^-/D^- ion sources exist, one encounters space charge problems when trying to put this scheme into practice. In this paper, a simple method, which uses a self-extracted D^- beam from a ring magnetron source, is proposed. The basic idea is presented, approximate numbers are given and the expected intensity is estimated. The method not only offers improvement in intensity, but equally important, improvements in reliability and lifetime.

44512 **(BNL—33273) Status of the AGS polarized negative-ion source.** Sluyters, T.; Alessi, J.; Kponou, A. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 12p. (CONF-830591—2). NTIS, PC A02/MF A01. Order Number DE83014764.

From Polarized ion workshop; Vancouver, Canada (23 May 1983).

Portions are illegible in microfiche products.

In the past year the polarized H^- source has been modified for use in the Alternating Gradient Synchrotron. The objective was to produce once every second a beam of several micro-amperes in 0.5 ms pulses. This goal was recently achieved; a polarized beam current with intensity of 7.5 μA was obtained.

44513 **(CONF-830311—182) Longitudinal phase-space matching between microtrons at 185 MeV.** Takeda, H. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 4p. NTIS, PC A02/MF A01. Order Number DE83014681.

From Particle accelerator conference; Santa Fe, NM, USA (21 Mar 1983).

Electrons are accelerated to 185 MeV by a microtron. Then, they are injected into another microtron to boost the net energy up to a few GeV. Between the two microtrons both longitudinal and transverse phase-space matching are required. In this paper, we consider a longitudinal phase-ellipse matching which utilizes triple left-right-left sector dipoles to induce a negative phase-angle shear. This is accomplished because a high-energy particle travels a shorter distance through the dipole system than a low-energy particle.

44514 **(DOE/ER/10759—3) Construction and maintenance of SUNY facilities at the National Synchrotron Light Source. Progress report, 1 July 1982-1 July 1983.** Bigeleisen, J. (State Univ. of New York, Stony Brook (USA)). 1983. Contract AC02-80ER10759. 59p. NTIS, PC A04/MF A01. Order Number DE83015573.

Experimental facilities on the X-21 beam line at the National Synchrotron Light Source are described, and synchrotron radiation experiments performed by PRT members are discussed. The report includes a description of the beam line development stages and the experimental equipment. (GHT)

44515 **(DOE/SF/00515—T10) Stanford Linear Accelerator Center monthly report for October 1982.** (Stanford Linear Accelerator Center, CA (USA)). 1982. Contract AC03-76SF00515. 18p. NTIS, PC A02/MF A01. Order Number DE83015333.

Portions are illegible in microfiche products.

Operational activities for the month of October 1982 are reported in the areas of accelerator and research operations, research area and experiment status, accelerator improvements, research division developments, PEP division developments, and publications for the month. (GHT)

44516 **(DOE/SF/00515—T11) Stanford Linear Accelerator Center monthly report for June 1982.** (Stanford Linear Accelerator Center, CA (USA)). 1982. Contract AC03-76SF00515. 22p. NTIS MF A01. Order Number DE83015341.

Microfiche only, copy does not permit paper copy reproduction.

Operational activities for the month of June 1982 are reported in the areas of accelerator and research status, accelerator improvements, research division developments, PEP division developments, and publications for the month. (GHT)

44517 **(DOE/SF/00515—T12) Stanford Linear Accelerator Center monthly report for December 1982.** (Stanford Linear Accelerator Center, CA (USA)). 1982. Contract AC03-76SF00515. 19p. NTIS, PC A02/MF A01. Order Number DE83015338.

Portions are illegible in microfiche products.

Operational activities for the month of December 1982 are reported in the areas of accelerator and research operations, research area and experiment status, accelerator improvements, research division developments, PEP division developments, and publications for the month. (GHT)

44518 **(DOE/SF/00515—T13) Stanford Linear Accelerator Center monthly report for May 1982.** (Stanford Linear Accelerator Center, CA (USA)). 1982. Contract AC03-76SF00515. 16p. NTIS, PC A02/MF A01. Order Number DE83015335.

Portions are illegible in microfiche products.

Operational activities for the month of May 1982 are reported in the areas of accelerator and research operations, research area and experiment status, accelerator improvements, research division developments, PEP division developments, and publications for the month. (GHT)

44519 **(DOE/SF/00515—T15) Stanford Linear Accelerator Center monthly report for November 1982.** (Stanford Linear Accelerator Center, CA (USA)). 1982. Contract AC03-76SF00515. 18p. NTIS, PC A02/MF A01. Order Number DE83015334.

Portions are illegible in microfiche products.

Operational activities for the month of November 1982 are reported in the areas of accelerator and research operations, research area and experiment status, accelerator improvements, research division developments, PEP division developments, and publications for the month. (GHT)

44520 **(DOE/SF/00515—T16) Stanford Linear Accelerator Center monthly report for September 1982.** (Stanford Linear Accelerator Center, CA (USA)). 1982. Contract AC03-76SF00515. 16p. NTIS MF A01. Order Number DE83015332.

Microfiche only, copy does not permit paper copy reproduction.

Operations are reported for accelerator and research operations, research area and experiment status, acceleration improvements and developments in research division and PEP division. (GHT)

44521 (GSI—82-8, pp 87-107) **Ion sources and low energy beam transport.** Keller, R. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The author gives a review about the development of ion sources suitable for heavy ion fusion. He presents two new types of ion sources, a duopatron version and a multipole/reflex discharge.

44522 (GSI—82-8, pp 150-160) **RFQ development at Frankfurt.** Klein, H.; Daehne, M.; Deitinghoff, H.; Gerhard, A.; Halfmann, K.D.; Junior, P.; Langbein, K.; Mueller, J.; Neumann, W.; Schempp, A. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In Frankfurt we concentrated on two types of rf resonators: the split-coaxial structure and the O-mode structure. The work on these structures is subsequently reported in this paper. In addition results of sparking experiments are given.

44523 (GSI—82-8, pp 290-307) **Multiturn injection for heavy ion fusion.** Prior, C.R. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In this paper we restrict attention primarily to injection processes which minimise the phase space dilution with no accompanying loss of particles. Using as a guideline the storage ring system devised by King and Maidment, a general scheme is described which achieves the prescribed dilution when the effects of space-charge forces are ignored. The results of a computer simulation of the injection process with a tracking program incorporating a Poisson solver to calculate the self-fields are then presented, and we consider the effects of spacecharge in producing both increased dilution and beam loss. Finally some components are made on the inherent non-linearity of the resulting beam.

44524 (GSI—82-8, pp 340-355) **Kickers and septa for the fast extraction of the beams of HIBALL.** Fiander, D.C. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The proposed kickers and septa for the fast extraction of the beams of the Transfer, Condenser and Storage rings of HIBALL are examined in the light of current experience of similar equipment at CERN. Where the HIBALL proposals require technological solutions well in excess of the present 'state of the art', alternative solutions are suggested.

44525 (GSI—82-8, pp 376-386) **Final focusing of 10 GeV bismuth ions.** Maidment, J.R.M.; Prior, C.R. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The first order design of a beamline which takes a 10 GeV Bismuth beam from a periodic channel and focuses it on to a 3 mm radius fusion target is presented. Both momentum and current sensitivity of this beam line are discussed. The major source of geometric aberrations is identified, the influence on spot size is evaluated and a correction system is devised using approximate but relatively fast algorithms. The validity of the corrections is examined using a particle in cell code which finds the self-consistent space charge force resulting from the evolution of the beam distribution in the presence of non-linear forces.

44526 (GSI—82-8, pp 387-394) **Final focusing concepts in the HIBALL study.** Wollnik, H.; Brezina, J. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The final focusing system for an inertia confined fusion reactor must fulfill the following conditions: 1. it has to concentrate the accelerated ion beam onto a spherical pellet with a radius of 3 to 4 mm with minimal loss of intensity; 2. besides the condition that costs for the final focusing devices should not be overwhelming it must be possible to arrange several of these devices around the reaction chamber without hampering its mechanical construction and performance; 3. The geometry of the final focusing system should be constructed so that neutron radiation emitted from the fusion pellet does not contaminate wide regions of the beam guidance lines.

44527 (GSI—82-8, pp 395-402) **Rutherford SNS beam experiments.** Rees, G.H. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The range of simulation experiments include: a. debunching of the linac beam. b. Storage ring longitudinal instabilities. c. Storage ring transverse instabilities. d. Bunch compression in the synchrotron ring. e. External beam transport at high space charge levels.

44528 (GSI—82-8, pp 435-447) **U.S. experimental program in inertial fusion.** Godlove, T.F. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In this talk, I describe briefly the experimental plans for the next few years in the U.S. inertial fusion program. I report on the status of the major facilities under construction, list the support facilities currently in use, and select example experiments from several of the major laboratories as illustrative of the program.

44529 (GSI—82-8, pp 454-513) **Recent U.S. target physics related research in heavy-ion inertial fusion.** Mark, J.W.K. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

A review is given about the target physics research in heavy-ion inertial fusion in the USA. Especially considered are target gains and relations to accelerator design, simulations for tamped targets and for disk experiments in accelerator test facilities, and deposition physics.

44530 (GSI—82-8, pp 514-542) **ICF-target studies of heavy ion fusion.** Meyer-ter-Vehn, J. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

In this talk, work on ICF targets for Heavy Ion Fusion performed at the Max-Planck-Institut for Quantum Optics at Garching in the period 1979-1982 is presented.

44531 (GSI—82-8, pp 585-597) **Importance of the beam geometry for the dynamical stability of inertial confinement fusion targets.** Buchwald, G.; Kruse, H.; Theis, J.; Maruhn, J.A.; Stoecker, H. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The stability of heavy ion driven inertial confinement fusion targets is investigated within a two-dimensional Eulerian hydrodynamic code. The importance of the beam geometry is studied. Following our results the HIBALL design in its present form seems to inhibit a spherical implosion of the target. It is shown that the beam angle in the HIBALL geometry should be about 35 degrees.

44532 (GSI—82-8, pp 598-619) **HIBALL target design: Ion-beam inertial confinement fusion pellet calculations.** Tahir, N.A.; Long, K.A.; Froehlich, R. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

This article presents an overview of the work done in the area of target design for the HIBALL reactor study. We present simulation studies of compression, ignition and burn phases in a typical reactor-size ion-beam target. These simulations have been done using an updated version of a 1-D Lagrangian computer code MEDUSA. We also discuss the hydrodynamic stability of this target and the importance of radiation effects in these pellet calculations.

44533 (GSI—82-8, pp 620-625) **HIBALL target and reactor neutronic and photonic calculations.** Henderson, D. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The suitable target design was chosen from the available published literature. This particular target was designed for use with a proton beam and was a design by Bangerter.

44534 (IFVE-OUNK—82-27) **Measurement of proton beam intensity and efficiency at slow extraction.** Lyudmirskij, Eh.A.; Merker, Eh.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702100.

7 refs.; 3 figs.; submitted to the journal Ins rum. Exp. Tech.

A system consisting of secondary emission chamber (SEC) and charge-frequency converter is described. It is assigned for measurements of the proton beam intensity and efficiency at slow extraction. SEC consists of three aluminium foils of 9 μm thick. Foils are tightened on the stainless steel mandrel. Glass bushings insulate mandrels from each other and from mounting rods. Outside foils (collectors) are supplied by 220 V accelerating voltage. The output signal goes from the central foil (emitter). The results on rig tests and experimental check of the device in the proton beam are presented.

44535 (INIS-SU—104, pp 342-345) **Autonomous cryogenic targets for neutron-physical experiments.** Brazulev, D.P.; Nichinskij, N.A.; Stanik, A.M.; Chupanova, L.I. (Tomskij Politekhnicheskij Inst. (USSR). Inst. Yadernoj Fiziki, Ehlektroniki i Avtomatiki). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-8009198—Pt.4).

From 5. national Soviet conference on neutron physics; Kiev, Ukrainian SSR (15 Sep 1980).

Structure of autonomous cryogenic targets on the basis of microcryogenic gas machines for experiments on neutron physics and physics of high energies is described. A technique for calculation of coolant condensation within the target volume is described as well. Process flow diagram of hydrogen (deuterium) liquefaction as well as experimentally obtained dependence of hydrogen liquefaction process dynamics are given. Minimum temperature of liquefield hydrogen corresponds to 19.5+-0.2K.

44536 (JINR—8-82-169) **Refrigeration of pulsed superconducting magnets with coil parallel cooling by two-phase helium.** D'yachkov, E.I.; Zel'dovich, A.G.; Smirnov, A.A.; Khodzhibagiyan, G.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702105.

Portions are illegible in microfiche products2 refs.; 2 figs.

A forced circulation of helium vapour-liquid flux in coil channels or inside a hollow superconductor - a promising way of refrigirating magnets for superconducting synchrotrons is discussed. In order to determine maximum permissible vapour quality at the outlet from parallel channels, a permissible difference of hydraulic resistances for parallel, circuits and study of instabilities in the two-phase helium flow, a magnet with parallel feeding of its half-coils of two-phase helium has been created. It is shown that the refrigiration of "window frame" type magnets with a hollow superconductor and parallel cooling by two-phase helium is possible. Vapour quality at the outlet from parallel channel was reduced up to 0.7 and entry flow subcooling up to 0.2 K. Hydraulic resistances for channels differed by twice.

44537 (JINR—9-82-177) **Dubna synchrophasotron. Operation and improvement (June - September, 1981).** Anishchenko, N.G.; Beznogikh, Yu.D.; Valevich, A.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702107.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 2 figs.; 3 tabs.

Information is presented on the operation of the Dubna synchrophasotron, in particular the intensity of accelerated particles and the scientific program implemented over a period of June-September, 1981. A source of polarized deuterons ("Polyaris") was mounted at the Dubna synchrophasotron. First information was obtained on the acceleration of polarized deuterons. Fibre-optical lines were used in the control system of this source. Geodesic measurements are being continued to control vertical shifts of the accelerator electromagnet.

44538 (JINR—9-82-406) **Transport channel for extracted proton beam of JINR phasotron.** Kuz'min, E.S.; Mirokhin, I.V.; Obukhov, Yu.L.; Savchenko, O.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702113.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 4 figs.; 2 tabs.

The variant of a strong focusing channel to transport the proton beam of JINR phasotron from the accelerator vacuum chamber to the target of a wide angle π-meson lens assigned to form the medical beam of π-minus mesons is considered. It is shown by calculations that there are such modes of operation of the channel when is possible to transport external proton beam without losses, and to obtain the given shape of the proton beam cross section on the meson production target at the end of the channel.

44539 (JINR—9-82-423) **Automation of measurements, parameter correction and control of the LIU-30 accelerator.** Zhuravlev, V.V.; Zamrij, V.N.; Matora, I.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 4p. (In Russian). (CONF-8210133—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702115.

From 8. All-Union conference on charged particles accelerators; Protvino, USSR (1 Oct 1982).

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 1 fig.

The automation system for data acquisition and control plays an essential role in providing reliable and economical operation of the LIU-30 accelerator (electron energy 30 MeV, current 250 A and pulse frequency 50 Hz) under constructions. Conditions and distinctive features of the system including several subsystems are considered. The latter are intended for measuring, control and correction of parameters of modulators, of axis location, focusing and structure of the beam, as well as of technological equipment of the accelerator.

44540 (JINR—9-82-424) **Systems of supply and monitoring of MT-22 microtron.** Belov, A.G.; Bondarenko, P.G.; Kuznetsov, A.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702116.

Portions are illegible in microfiche products0 refs.; 10 figs.

Description and electrical circuits of the supply system and generator-synchronizer of the MT-22 microtron are presented. The microtron feeding is executed with the packaged regulated current supplies based on tiristor converters. The supplies have long time

stability not worse than $3x10^{-4}$ and ripple factor less than 10^{-3}. The generator-synchronizer carries out different modes of timing of the microtron pulse, determines the exposure time and controls the measuring apparatus.

44541 **(JINR—13-82-221) Induction pick-up of placement of electron beam centre of gravity.** Evdokimov, N.N.; Kiryushin, Yu.T.; Kolesnikov, Yu.M.; Nevskaya, N.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702101.

Microfiche only, copy does not permit paper copy reproduction refs.; 3 figs.

For diagnostics of SILUND-20 electron beam induction pick-ups of placement of centre of gravity have been developed. The detector is a ferrite ring with four winding, confined into the metallic screen. The signals are fed to the electron blocks in CAMAC standard and further on, into computer, where the coordinates of center of gravity and the beam charge are calculated. The detector construction is described. The estimation of its precision is given. The results of on-line tests on the measurements of pick-up characteristics are presented: - resolution on X and Y in the circle with the radius of 3 cm is not less than 1 mm; - precision of the charge measurement amounts to 0.5%; - leading and travelling edges are not longer than 3 ns.

44542 **(JINR—13-82-254) Measurements of the mean energy of proton beam (approximately 1 GeV) extracted from the LINF synchrocyclotron using the Cherenkov method of double reflections.** Zrelov, V.P.; Lupil'tsev, V.P.; Mirokhin, I.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702102.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 8 figs.; 5 tabs.

Results of measurements of the mean energy of protons in the beam extracted from the LINF synchrocyclotron are presented. The beam mean energy was determined by the Cherenkov method of double reflections. The obtained results are compared with the beam energy determined by a different method. It is demonstrated that the Cherenkov instrument for measuring the energy of protons in a beam by the method of double reflections allows one to determine the mean beam energy in the vicinity of 1 GeV with relative accuracy not worse than 0.1%.

44543 **(JINR—13-82-279) Multichannel fiber-optical lines in the control system of the "Polaris" source.** Romanov, Yu.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702103.

Portions are illegible in microfiche products0 refs.; 5 figs.; submitted to the journal Instrum. Exp. Tech.

Two wide-strip systems of fiber-optical lines (FOL) for digital information transmission alona a light pipe channel are described. Applying monofiber and braided light pipes is the base of the systems. Light diode intensity modulated radiation is the information carrier. The photodiode is used in the receipt module as an image converter. Light pipes are connected to the electronics by means of joints. Light losses at input-output of the devices constituted 1.5 - 2 dB. The FOL length is 5 m. The calculated information transmission frequency range is from zero to 1 MHz (the first system) and to 10 MHz (the second system).

44544 **(JINR—13-82-378) Liquid-tritium target for mesoatomic and mesomolecular experiments.** Bystritskij, V.M.; Dzhelepov, V.P.; Zinov, V.G.; Konin, A.D.; Stolupin, V.A.; Utkin, V.A.; Shamsutdinov, Sh.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 60p. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83702095.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 2 figs.; submitted to the journal Instrum. Exp. Tech.

A liquid-tritium target for mesoatomic and mesomolecular experiments is described. Its characteristic parameters are discussed. The temperature of tritium in the target can be varied between 20.4 K and 30 K, and its maximum radioactivity can be chosen as high as $8.5x10^{6}$ Cu.

44545 **(JINR—16-82-170) Radiation situation on the 16 MeV electron accelerator-microtron.** Belov, A.G.; Komendantova, G.A.; Teterev, Yu.G.; Cherevatenko, A.P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 14p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702104.

Paper copy only, copy does not permit microfiche production2 refs.; 5 figs.; 2 tabs.; submitted to the journal Sov. J. At. Energy.

Adequacy of responses and limits of the use of different dosimetric instruments in radiation fields of a microtron were investigated. It is shown that gamma dosemeters based on a scintillation detector are more appropriate, whereas for GM counter dosemeters the upper limit of measuring doses is much lower than for continuous radiation. Commercial neutron dosemeters based on scintillation detectors cannot be applied for measurements under radiation conditions of the microtron. A corona neutron counter in a polyethylene moderator is recommeded for purposes of neutron dosimetry. It is established that it is the radiation danger during microtron operation that determines mainly the bremsstrahlung. The induced radioactivity at a given electron energy does not present serious problems for operation. Microtron water cooling system and air ventilation system do not require any special devices for providing radiation safety.

44546 **(JINR-R—9-82-124) Temperature distribution in targets irradiated by heavy ions.** Kuznetsov, V.I.; Rusakovich, N.L. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702119.

Microfiche only, copy does not permit paper copy reproduction refs.; 3 figs.; 3 tabs.

Temperature distribution in cyclotron targets irradiated by heavy ion pulsed beams is calculated. The obtained temperature distributions are described by solutions of heat equation. Three types of targets are considered: a round foil, a thick plate mounted at an angle to ion beams and an extremely thin film being cooled with black-body radiation. The temperature values are calculated for these targets irrdiated by Ne, Ca, Fe ions with 7-8 MeV/nucleon energy. Results are presented for various beam parameters and target sizes. The use of the given equations enables one to consider possibilities and appropriateness of such targets applied in experiments on heavy ion accelerators.

44547 **(JINR-R—9-82-301) MT-22 microtron.** Belov, A.G.; Bondarenko, P.G.; Simane, C.; Wognar, M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702122.

Portions are illegible in microfiche products2 refs.; 6 figs.

The results of the joint work on design and construction of a microtron carried out at the Laboratory of Nuclear Reactions (JINR) and the Polytechnical Institute (Prague) are presented. The design of several accelerator parts and systems, its setup, operating parameters are briefly described. The microtron is capable of accelerating electrons upto 22 MeV (maximum number of orbit is 24) with beam intensity of 20 μA. The electrons accelerated are used to produce bremsstrahlung and neutron beams. The thermal neutron density at the centre of graphite moderator with U-Be converter is $6x10^{9}$ neutron/s cm^{2}. Total yield of fast neutrons is $6x10^{11}$ neutron/s.

44548 **(JINR-R—9-82-317) Cyclotron acceleration of $C_{13}3i$ ions produced in a laser plasma.** Anan'in, O.B.; Bykovskij, Yu.A.; Gikal, B.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1982. 3p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702123.

7 refs.; 1 fig.; submitted to the journal JETP Lett.

The study on the C_{13}^{3+} ions acceleration at the U-200 cyclotron produced from a laser plasma is given. The CO_2 laser with a transversal discharge is used in the ion source, its working frequency is approximately 1 Hz and pulse total energy is 0.4 J. Laser radiation put into the cyclotron through the vertical channel of the electromagnet pole and focused on the target placed in the center of the cyclotron at the definite distance from the emission window. The intensity of the accelerated ion beam was (4-)x10^8 particle pulse at the laser radiation power density of approximately 10^9 W/cm^2. The ion integral current at the output of the source constituted (1-3)A, current density being approximately 10 A/cm^2 which is an order higher of ion current density from an ordinary are source. The use of the laser ion source allowed to widen the range of accelerating ions at existing cyclotrons, to use target materials which can't be used in an arc ion source due to specificities of construction or their physico-technical properties.

44549 (JINR-R—11-82-230) Simulation of ionization front forming at injection of relativistic electron beam in a gas chamber. Dolya, S.N.; Zhidkov, E.P.; Rubin, S.B.; Semerdzhiev, Kh.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702117.

9 refs.; 7 figs.

The methodical work on creation of a computer program for numerical study of the processes of forming and motion of a virtual cathode at the injection of relativistic electron beam into a short cylindrical chamber, filled with gas, has been carried out. The obtained plots of the distributions of fields, potential and density appearing out of ion and electron gas of the beam itself are presented. The dependence of cross-section ionization on the electron velocity has been taken into account in the calculation. The resonance contribution into summarized cross-section of ionization was simulated. It is shown that at the injection into the chamber without gas, some oscillations of the virtual cathode are observed. At the presence of the final front of the beam, the fields level at the initial stage is smaller than for the beam with a sharp front. However, in some time the field amplitudes are compared. The motion of simulated probe "ions" in the chamber is analyzed.

44550 (KIYI—81-18) Simple current-to-frequency converter. Isaev, A.G.; Urin, V.N.; Khaldin, S.F. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1981. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702124.

Portions are illegible in microfiche products ref.; 2 figs.

A simple current-to-frequency converter with 10^{-13}A threshold is described. It's integral nonlinearity is less than 1% in 10^{-9}-10^{-6} A current range with long-term and thermal stability are 0.5% and 0.05%/deg C respectively. Converter is able to drive 5 V into the matched long cable.

44551 (KIYI—81-21) Intensity losses at H^- ion acceleration in the cyclic accelerators at low and medium energies. Bykov, V.I.; Linev, A.F.; Olejnik, E.E. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1981. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702125.

7 refs.; 4 figs.

H^- ion losses are considered at the magnetic field and on residual gas of the cycle accelerators on low and medium energies. Beam losses of the Kiev isochronous cyclotron U-240 are evaluated by means of the obtained analytical dependence of losses on the acceleration radius. The experimental data for losses in TRIUMF are in good agreement with calculation according to the obtained formulas RT.

44552 (LA-UR—83-1808) RSX system development under VAX/VMS compatibility mode. Fuka, M.A. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 7p. (CONF-830577—3). NTIS, PC A02/MF A01. Order Number DE83014151.

From Digital Equipment Computer Users Society (DECUS) symposium; St. Louis, MO, USA (23 May 1983).

The Control System for the Proton Storage Ring now being built at Los Alamos will use a VAX-11/750 as its main control computer with several LSI-11/23 microprocessors reading and controlling the hardware. The VMS Compatibility Mode makes it possible to use the VAX as a development system for the LSI-11/23 microprocessors running the RSX-11S (stand-alone) operating system. Digital Equipment Corporation (DEC)-supplied software is used to generate the RSX-11S operating system and DECNET-11S network software. We use the VMS editors to create source files, the Macro-11 assembler and the PDP-11 Fortran-77 compiler to generate object code, and the RSX Task Builder to link the executable RSX task image. The RSX task then can be tested to some extent on the VAX before it is down-line loaded to the LSI-11/23 for further testing.

44553 (LBL—16171) LULU analysis program. Crawford, H.J.; Lindstrom, P.J. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 8p. (CONF-830576—9). NTIS, PC A02/MF A01. Order Number DE83014904.

From Real-time computer applications in nuclear and particle physics conference; Berkeley, CA, USA (16 May 1983).

Portions are illegible in microfiche products.

Our analysis program LULU has proven very useful in all stages of experiment analysis, from prerun detector debugging through final data reduction. It has solved our problem of having arbitrary word length events and is easy enough to use that many separate experimenters are now analyzing with LULU. The ability to use the same software for all stages of experiment analysis greatly eases the programming burden. We may even get around to making the graphics elegant someday.

44554 (SLAC/AP—3) Ideal of the perfect magnet-superconducting systems. Shoaee, H.; Spencer, J.E. (Stanford Linear Accelerator Center, CA (USA)). Apr 1983. Contract AC03-76SF00515. 8p. NTIS, PC A02/MF A01. Order Number DE83015080.

Portions are illegible in microfiche products.

In this report, we study an iron-free, superconducting, elliptical coil quadrupole which has been proposed by General Atomics for use in the SLC final focus system. Beth has shown that such coils might provide a pure quadrupole field ignoring 3-D effects. Similarly, recent studies of rare earth permanent magnets have shown that, at least in principle, these magnets can also be made arbitrarily pure. Since similar claims can be made for conventional iron-core electromagnets either by demanding pure hyperbolic pole contours or using tricks, it is interesting to consider just how wide the gulf between principle and practice really is for each type of magnet and what it takes to bridge it (and where one is most likely to fall off). Here we consider only the superconducting option because its greater strength, variability and linearity make it potentially useful for the SLC and the low-beta insertions of the high energy storage rings such as PEP.

44555 Calculation of antoproton yields for the Fermilab Antiproton Source. Hojvat, C.; Van Ginneken, A. (Fermi National Accelerator Lab., Batavia, IL (USA)). *Nuclear Instruments and Methods in Physics Research;* **206**: No. 1/2, 67-83(15 Feb 1983).

The available experimental data for antiproton production are described by an analytical formula, including target nucleus dependence. This formula, in conjunction with a Monte Carlo program that includes the effect of hadronic showers, is used to optimize the design of the Fermilab Antiproton Source. Comparison is made with measurements of yields at the CERN Antiproton Accumulator.

44556 (SLAC-Trans—203) Fragment of the system for tracking accelerator deformations, and test results for the system. Bokov, M.A.; Gudkov, A.V.; Zyukin, A.G.; Pupkov, Yu.A. Translated from Trudy Nauchno-Issledovatel'skogo Instituta Prikladnoi Geodezii *Trudy Nauchno-Issledovatel'skogo Instituta Prikladnoi Geodezii;* No. 4, 52-60(1980). Contract AC03-76SF00515. 8p. NTIS, PC A02/MF A01. Order Number DE83014472.

The requirements for accuracy in the mounting of accelerator magnet assemblies in the design position are extremely high. It has been found that at least four or five adjustments of the assem-

blies are required per year to ensure normal operation of the colliding electron-positron beam accelerator of the Institute of Nuclear Physics, Siberian Branch, USSR Academy of Sciences. Each adjustment can be made only after a complete cycle of geodetic measurements is performed, which entails sizable labor costs and losses due to the downtime of scientific equipment. This necessitated the development of a measuring information system (MIS), which was implemented by the Scientific Research Institute of Applied Geodesy in conjunction with the Institute of Nuclear Physics. The requirement was added that the system be optimized with respect to both standard metrological and economic performance indices. The required properties of the measuring information system were formulated with consideration for the results of an analysis of deformations of the accelerator tunnel, specific production tolerances, and the accuracy of the original geodetic positioning of the equipment in the design location.

4304 Storage Rings

REFER ALSO TO CITATION(S) 44502, 44503, 44504, 44505, 44507

44557 (GSI—82-8, pp 278-289) **Coasting beam instabilities in storage rings.** Laclare, J.L. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Some of the existing scenarios for heavy ions drivers include accumulator, condenser and storage rings in their scheme. Because of the strong space charge forces involved, the beam is both transversely and longitudinally unstable. Therefore, in order to prevent the emittances from blowing up, one has to shorten the time the beam spends in any of these circular machines. The growth time of the instability is very short < 1 ms. Thus, it does not exist any solution to storing of the beam. This applies also to the HIBALL scenario. In this case, one has to give the existing scheme another thought keeping in mind that none of the rings is capable of storing a beam for more than 1 ms or so without an irreversible spoiling of the emittances.

44558 (GSI—82-8, pp 356-361) **Discussions of the storage ring group.** Teng, L.C. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The effort was devoted exclusively to a careful examination of the designs and parameters of the storage rings in the HIBALL scenario. The conclusions, all tentative, are summarized.

44559 (GSI—82-8, pp 403-434) **Japanese facilities for HIF accelerator development.** Katayama, T.; Noda, A.; Hirao, Y. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Ion storage ring named TARN has been successfully operated at INS, which stores the low velocity ions (approx. equal to 7 MeV/u) in the betatron and synchrotron phase spaces by the amount of a few hundred turns. The operation results of the ring are described as well as the possible use of the ring for the study of beam dynamics in the storage ring of HIF scenario. Design outlines of NUMATRON, high energy heavy ion accelerator project in Japan, are given especially from the point of view of its usefulness for HIF accelerator study.

44560 **(PEP-NOTE—372) Application of the Green's function method to some nonlinear problems of an electron storage ring. Part I. The Green's function for the Fokker-Planck equation.** Kheifets, S. (Stanford Linear Accelerator Center, CA (USA)). Jul 1982. Contract AC03-76SF00515. 14p. NTIS, PC A02/MF A01. Order Number DE83014829.

Part I of this work consists of the formal solution of the Fokker-Planck equation in terms of its Green's function and describing the Green's function itself. The Green's function and the description of some of its properties can be found in the Appendices. It discusses the distribution function in the transverse phase space of a particle and it's Fokker-Planck equation for a simple case of a weak focussing machine. The Green's function and solution of this equation are described. Then, this technique is applied to a strong focusing machine and finally there is a discussion of applicability of this method, its limitations and relation to other methods (such as the Hamiltonian method).

44 INSTRUMENTATION

4401 Radiation Instrumentation

REFER ALSO TO CITATION(S) 43388, 43389, 43963, 44553, 44649, 45058, 45062

44561 **(BNL—33324) Detectors for CBA.** Baggett, N.; Gordon, H.A.; Palmer, R.B.; Tannenbaum, M.J. (eds.). (Brookhaven National Lab., Upton, NY (USA)). May 1983. Contract AC02-76CH00016. 49p. NTIS, PC A03/MF A01. Order Number DE83015198.

Portions are illegible in microfiche products.

We discuss some current approaches to a large solid angle detector. An alternative approach for utilizing the high rate of events at CBA is to design special purpose detectors for specific physics goals which can be pursued within a limited solid angle. In many cases this will be the only way to proceed, and then high luminosity has a different significance. The total rate in the restricted acceptance is less likely to be a problem, while the need for high luminosity to obtain sufficient data is obvious. Eight such experiments from studies carried out in the community are surveyed. Such experiments could be run on their own or in combination with others at the same intersection, or even with a large solid angle detector, if a window can be provided in the larger facility. The small solid angle detector would provide the trigger and special information, while the facility would provide back-up information on the rest of the event. We consider some possibilities of refurbishing existing detectors for use at CBA. This discussion is motivated by the fact that there is a growing number of powerful detectors at colliding beam machines around the world. Their builders have invested considerable amounts of time, money and ingenuity in them, and may wish to extend the useful lives of their creations, as new opportunities arise.

44562 **(CEA-CONF—6166) Development of a system for the measurement of contamination by plutonium: captor and RC signal post for plutonium and other transuranium elements aerosols.** Grimont, B.; Laureana, R.; Carossi, J.C.; Da Costa, D. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). May 1981. 5p. (In French). (CONF-8105160—3). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701812.

From Seminar on the development of radioprotection techniques for nuclear energy workers; Cadarache, France (5 May 1981).

The problem of the "alarm" detection of radiative contamination by plutonium and other transuranic elements has not been satisfactorily solved with the equipment development over the last few years (EAR, MDPu, DFF.Pu ...): - inadequate detection sensitivity (flow rate, detectors, energy decay of particles in the filter element or in the detection space, influence of background); - problems of aerosol capture and collection with unsuitably designed instruments; - research and development too centred on Pu 239 detection alone. A more thorough approach to the requirements of reprocessing plants, plutonium recycling laboratories, CEA users with material to replace or new facilities to equip has shown up the need to develop a captor and an RC signal post for the measurement of atmospheric contamination by plutonium and other transuranic aerosols, especially Pu 238. Preliminary work has shown that such an apparatus must be designed with a new detection head by which a flow rate of 100 l/mn may be obtained under satisfactory sampling and collection conditions.

44563 **(CEA-CONF—6359) Bragg crystal spectrometer for the soft X-ray diffuse background.** Rocchia, R.; Blondel, C.; Arnaud, M.; Cantin, M.; Mougin, B.; Rothenflug, R. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Jun 1982. 4p. (CONF-820582—7). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701813.

From 24. COSPAR meeting (Committee on Space Research); Ottawa, Canada (17 May 1982).

The difficulty is that the observed source is extended with a very low surface brightness (on the order of 1 photon $cm^{-2}s^{-1}ster^{-1}$). The purpose of this paper is to present a new instrument making use of old classical concepts which combines a high sensitivity and a fine spectral resolution. Valuable observations can be made in 10^4 seconds.

44564 **(CEA-R—5176) Accelerating field spectrometer for photons and electrons simultaneous measurement. Application to decay schemes study.** Busani, J. (CEA Centre d'Etudes de Bruyeres-le-Chatel, 92 - Montrouge (France); Strasbourg-1 Univ., 67 (France)). Sep 1982. 144p. (In French). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83701814.

Thesis.

An original spectrometer was built to improve the measurement of the absolute emission intensities of radionuclides with converted low energy gamma transitions. In this spectrometer, the same Si(Li) detector simultaneously measures electrons and photons emitted by the studied radionuclide; an electrostatic field may be established between the source and the detector to modify the electrons energy. This field allows the electron and photon peaks to be separated, and the absorption and energy straggling by detector windows to be decreased. Special attention has been given to determine spectrometer efficiency calibration curves for electrons and photons. ^{147}Nd and ^{133}Ba were used to test the spectrometer improvement and the method used.

44565 **(CEA-R—5181) Project "REMAD", Neutron spectrometry. Code "SOHO - phase II". First part "FORMULATION".** Zaborowski, H.L. (CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-les-Durance (France)). Aug 1982. 80p. (In French). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83702075.

"SOHO" is a new neutron spectrometric code with large potential applications besides the BONNER spheres system for which it has been initially developped. This code makes use of a new and original iterative procedure for the search of approximate solutions from the Fredholm integral Equation of the First kind whose Resolution Function is experimentally and/or mathematically defined (e.g. the Log-Normal Hypothesis for the BONNER Spheres). Upon discretization of the Fredholm integral Equation we get systems of non-exact homogeneous linear equations: $Q X = e$ whose approximate solutions are given when: $Q X \rightarrow 0$. We show that the iterative procedure converges absolutely leading to the existence of the approximate solutions, independently of the kind of initialization used. For the applications to health physics of the BONNER sphere "SOHO" has been programmed on a HP - 41 CV calculator.

44566 **(CEA-R—5188) Experimental measurement of the photon efficiency of a 4 mm thick NE 102 A scintillator for 14 MeV neutrons.** Haas, Philippe; Marmouget, J.G. (CEA Centre d'Etudes de Bruyeres-le-Chatel, 92 - Montrouge (France)). Aug 1982. 49p. (In French). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702161.

The purpose of this experiment is to determine the photon efficiency of a 4 mm thick NE 102 A neutron pinhole imaging system. Neutrons are produced by 1.5 MeV deuterons (accelerated in a VAN DE GRAAFF accelerator located at C.E.A.-Centre d'Etudes de Bruyeres le Chatel) interacting on a gaseous tritium target. A numerical calculation enables to estimate the energy deposition from a neutron in the scintillator. The photoconversion efficiency of the NE 102 A scintillator is determined. In order to confirm the results obtained with the neutrons, a complementary experiment has been made on the NE 102 A scintillator with a 10000 curies Co^{60} gamma source. The values obtained for the photoconversion efficiency are respectively (4.23 +- 0.42)% for neutrons and (4.16 +- 0.42)% for gamma.

44567 **(DOE/EV/10673—T1) Instrument to detect vapor-nucleation in superheated liquid.** Apfel, R.E.; Roy, S.C. (Yale Univ., New Haven, CT (USA)). 1981. Contract AC02-81EV10673. 9p. NTIS, PC A02/MF A01. Order Number DE83015268.

An instrument to detect the vaporization of superheated drops is described. Using this instrument, quantitative tests have been performed of the response of the superheated drop neutron detector, a tool for possible use in neutron dosimetry, area monitoring, and nuclear spectroscopy.

44568 **(DOE/EV/10673—T2) Investigations on the applicability of superheated drop detectors in neutron dosimetry.** Apfel, R.E.; Roy, S.C. (Yale Univ., New Haven, CT (USA)). 1983. Contract AC02-81EV10673. 23p. NTIS, PC A02/MF A01. Order Number DE83015150.

Superheated drop detectors (SDD) made of four different liquids have been tested at the US National Bureau of Standards to study their response under irradiation by neutrons ranging in energy from fast to thermal. A comparison of responses and features of SDDs with the ideal neutron dosimeter and other currently used dosimeters has been made. The results, among other important observations, show that SDD made of refrigerant 12 (CCl_2F_2), du Pont Trade Name Freon 12) is a promising candidate to be used in neutron dosimetry.

44569 **(DP-MS—83-7) Tritiated-water detection with a $^2D(\gamma,n)^1H$ monitor.** Winn, W.G.; Baumann, N.P. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.). [nd]. Contract AC09-76SR00001. 30p. NTIS, PC A03/MF A01. Order Number DE83015405.

Tritiated process water is monitored by detecting the D_2O component via the $^2D(\gamma,n)^1H$ reaction. A probe containing a 1 to 7 mCi ^{24}Na (15 h) γ-source and six ^3He neutron detectors produces and monitors the $^2D(\gamma,n)^1H$ reaction. A variety of probe configurations were examined for D_2O detection sensitivity. The corresponding detection limits range from 6 to 280 μL for D_2O droplets and 1 to 13 μL/cm for D_2O streams, when 10-minute neutron counting with a 1 mCi γ-source is used. Results from two field applications illustrate the utility of the monitor.

44570 **(IFVE-OEA-OEIPK—82-15) Special program-controlled processor of the MELAS system and its software.** Berezhnoj, V.A.; Kryutchenko, E.V.; Nikitin, S.G.; Utochnkin, B.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702189.

Paper copy only, copy does not permit microfiche production refs.; 3 figs.

A special program-controlled processor of the scanning measuring projector system is described. This processor is the kernel of the system control part. The processor is used also for calculation of scanning spot trajectories and for output of a graphical information on the TV screen. Software of the special processor is described too.

44571 **(IFVE-OEF—82-115) Study on the coordinate precision of hodoscope hadron calorimeter at energies up to 300 GeV.** Binon, F.; Guanehr, M.; Davydov, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702162.

Portions are illegible in microfiche products2 refs.; 10 figs.; 1 tab.

To investigate hodoscope calorimeter resolution at the energy of 300 GeV, the possibilities of a high-precision localization of hadronic showers and hadron coordinate determination at high energies have been studied. A novel experimental technique is used, the hodoscope hadron calorimeter which measures the energy released by shower, in its lateral cross-section. It is shown that the accuracy of hadron coordinate definition improves with energy. At E=300 GeV it attains 3 mm. The dependences have been found to describe the shrinkage of hadronic showers with energy and the in-

crease of its central component. By the energy resolution the hodoscope calorimeter does not yield the ordinary calorimeters.

44572 **(IFVE-OEIPK—82-122) Analysis of the data recorded from the intermediate gamma detector of the European hybrid spectrometer on the base of the statistical model of an electromagnetic shower.** Gumenyuk, S.A.; Kistenev, Eh.P.; Nikitin, S.G.; Petrovykh, Yu.L.; Stopchenko, V.A.; Fisyak, Yu.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702163.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 7 figs.

The description of the main principles of the off-line software used for the analyses of the data recorded from the intermediate gamma detector in the experiments on the European hybrid spectrometer is given. The method developed is based upon the statistical description of the shower, using the third-order spline approximation of the amplitudes deposited by the electromagnetic shower in the matrix of counters averaged over the library of real showers.

44573 **(IFVE-ORI—82-46) Investigation of polyethylene detector and adiabatic calorimeter in the radiation fields of proton accelerators.** Borodin, V.E.; Mokhov, N.V.; Rogov, V.A.; Rojnishvili, E.Yu.; Sukharev, M.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702164.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 6 figs.; 1 tab.; submitted to the journal Instrum. Exp. Tech.

The results on investigation of the absorbed energy detectors used at IHEP, i. e., polyethylene detector (PD)-based on hydrogen release from polymer under effect of ionizing radiation and adiabatic calorimeter (AC) are presented. The sensitivity function for these detectors for 6 MeV-3000 GeV hadrons have been calculated. The PD and AC readings have been measured and calculated for the radiation fields near the IHEP proton synchrotron vacuum chamber. The dependence of the calorimeter readings on the working medium has been studied. The PD has been calibrated with the AC. It is ahown that in the hadron spectra the calorimeter readings do not depend on the working medium in the limit of 8%. The PD calibration enchanced the accuracy of radiation dose measuring in the accelerator radiation mixed field. The sensitivity function calculations showed that detectors studied applied for measuring absorbed dose have the energy threshold, so for PD it is equal 18 MEV for protons, 6 MeV for charged pions. Results of investigations showed the possibility of PD utilization for measuring absorbed dose in different structural materials operating in mixed radiation fields of accelerators.

44574 (INIS-mf—7432, pp vp) **Some characteristics of a multiwire corona counter.** Holy, K.; Oravec, J.; Usacev, S. (Komenskeho Univ., Bratislava (Czechoslovakia). Prirodovedecka Fakulta). [nd]. (In Slovak). NTIS (US Sales Only), PC A06/MF A01. (CONF-7908174—Pt.1-Vol.1-Summ.).

From 6. conference of Czechoslovak physicists; Ostrava, Czechoslovakia (27 Aug 1979).

44575 (INIS-SU—104, pp 324-327) **Digital time-to-code converter.** Bobyr, V.V.; Bordulya, A.P.; Mitrokhin, O.E.; Mikhnitskij, I.B.; Shevchenko, V.A. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-8009198—Pt.4).

From 5. national Soviet conference on neutron physics; Kiev, Ukrainian SSR (15 Sep 1980).

Simple and reliable time-to-code converter has been developed for using together with AU-128.2 amplitude analyzer. Basic conver-- ter flowsheet is given and principle of its operation is considered. The converter has the following characteristics: 4V amplitude of input pulses of negative polarity, 1 μms duration of input pulses. The number of channels is 128. Value of the channel changes from 0.12 ms to 4.09 ms minimum resolution time amounts to 0.12 ms, output pulses correspond to TTL logic. The converter was used in experiments on study of delayed neutrons during U^{235} fission.

44576 **(ITEF—16(1982)) Installation for measuring angular correlation of two-photon annihilation of positrons in a condensed medium.** Komlev, V.P.; Kudinov, V.I.; Obukhov, Yu.V.; Funtikov, Yu.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702166.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 9 figs.

An installation with the linearly-slit geometry for detecting angular distribution of annihilation γ quanta arising in interaction of positrons with the investigated medium is developed and constructed. The length of each installation arm is 2.5 m., geometric solution 0.4 milliradian, intensity of used positron sources: 100 mki for Na^{22} and 1 Ki for Cu^{64}. Measurement and recording of results is performed on line according to the specified program. The angle variation range is divided into fixed intervals with an exact angle fixation in each operation point.

44577 **(ITEF—28(1982)) Laser for holographic track detection in a bubble chamber.** Mel'nichenko, I.A.; Silaev, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702167.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 1 fig.

The unimode ruby optical quantum generator (OQG) intended to be used as a light source in the holographic detection system of elementary particle tracks in a bubble chamber is described. Generator's parameters: maximum permissible light pulse energy - 0.87, radiation coherence length - 1 m, beam divergence - 3 min; light pulse duration - 40ns, speed of response - 1 pulse per 4s, service life number of operations - 40 ths. The results of holography by means of this generator of the track model optical fibres are presented. The realized experiments of full- scale holography of the chamber mock-up by means of the unimode ruby QQG have shown that the parameters of the developed gene-- rator and the method of focused image holography allow one to realize holographic detection of real tracks in the bubble chamber with high accuracy.

44578 **(ITEF—33(1982)) Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber.** Gorichev, P.A.; Egorov, O.K.; Makhlyueva, I.V.; Pozharova, E.A.; Shamanov, V.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki). 1982. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702168.

8 refs.; 4 figs.

For the purpose of search for new short-living particles the technique for determining the vertex localization for neutrino interactions in a hybrid detector (nuclear emulsion placed inside a bubble chamber) is developed. Twenty two 1-l modules of cryogenic nuclear photoemulsion have been placed inside a 15-ft bubble chamber FNAL filled with deuterium. Emulsion modules have been placed in two boxes and mounted on the front internal chamber wall. The localization of the interaction vertex has been determined by tracks of secondary charged particles visible in the bubble chamber. Measured and replaced tracks into the space have been extrapolated in the emulsion region with account for particle momentum and magnetic field in the chamber. For spatial reconstruction of events the geometric reconstruction program HYDRA GEOMETRY developed in CERN and adapted at the Institute of Theoretical and Experimental Physics (ITEPh) for image processing from the 15-ft chamber has been used. For particle tracks with a momenta $>=3.0$ GeV/c the root-mean-square deviation of measured and predicted angle values constitutes 0.4 deg and 0.6 deg by azimuth and immersion angle, respectively. These values correspond to the accuracy of angle measurement in emulsion.

44579 **(JEN—518) Calculation of the detection efficiency in liquid scintillators. II. Single positron emitters.** Grau, A.; Garcia-Torano, E. (Junta de Energia Nuclear, Madrid (Spain)). 1982. 74p. (In Spanish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701815.

Counting efficiency as a function of the figure of merit for 30 positron emitters has been computed from the positron energy spectrum. Only the efficiency contribution of positrons has been taken into consideration. The contribution of the annihilation fotons depending on the volume of the scintillator will be investigated in a near future. Efficiency as figure of merit is plotted and tabulated.

44580 **(JEN—521) Calculation of the detection efficiency in liquid scintillators. III. Single electron-capture radionuclides.** Grau, A. (Junta de Energia Nuclear, Madrid (Spain)). 1982. 28p. (In Spanish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701816.

Counting efficiency as figure of merit for 19 electroncapture radionuclides has been computed. Toluene based scintillator solution of 15 cm^3 has been assumed in the computation. The relationships to obtain the probability per decay are given and the computed efficiency tabulated.

44581 **(JINR—10-82-227) Optical constants of magnetic spark spectrometer.** Zajmidoroga, O.A.; Lytkin, L.K.; Laurikainen, P.; Palombo, F. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702169.

Paper copy only, copy does not permit microfiche production refs.; 1 fig.

For geometrical reconstruction of events, registered on two films, in the space of magnetic spark spectrometer the mathematical model of the spectrometer optics is constructed. It couples measurements of fiducial marks on film with space position in order to find parameters of the system which are the optical constants. The search of spectrometer optical constants is an iterative process during which the parameters in question are found in a modified model taking into account the distortion of measurements and distortion in space due to stretching of film, shifting marks in magnetic field and optical distortion. The optical constants found allow one to achieve high accuracy reconstruction of fiducial marks and particle tracks and to determine the momentum and angular resolution.

44582 **(JINR—10-82-232) Magnetic spectrometer data handling of JINR. Data handling system and pattern recognition of events.** Anan'eva, M.A.; Gal'perin, A.G.; Bachilieri, P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702170.

Portions are illegible in microfiche products3 refs.; 4 figs.; 1 tab.

Magnetic spectrometer data handling system is developed for HPD driving scanning device using display control and accuracy of measuring taking into account the distortion of the film and the distortion created by device and also automatic pattern recognition events. The main idea of algorithms, the method of turning and calibration are given. Using this system for massive MS data handling the high accuracy has been achieved.

44583 **(JINR—10-82-295) Parameter choice of a special microprocessor.** Govorun, N.N.; Dikusar, N.D.; Tkhang, T.L. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 16p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702171.

9 refs.; 5 figs.; 2 tabs.

A method for investigation of a special hardware processor (SHP) algorithm at measuring pictures from track chambers on HPD is proposed. The efficiency of processing with this algorithm depends on the calculated estimates: the degree of information reduce, the number of lost points, the reduce of data volume, pattern recognition and precision of processing. The efficiency of track information processing with regard to choosing SHP parameters was studied experimentally. The experimental curves for processing pictures from several track chambers are presented.

44584 **(JINR—10-82-391) Determination of beam particle track parameters in experiments on the MIS installation (JINR).** Vishnyakov, V.V.; Sychkov, S.Ya.; Laurikajnen, P. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702172.

8 refs.; 6 figs.

The method of the MIS installation (JINR) data processing for determination of beam particle track parameters is described. The least-squared method for determination of track parameters is used. The construction of the complete covariance matrix of errors and correlations in beam particle multiple scattering is given. Undisplaced estimations of track parameters and their errors are determined as a result of correct account for multiple scattering. The errors are 0.07 mrad and 0.25 mm for angle and the coordinate of track on a target, the error of $\Delta p/p_0$ is 0.18%.

44585 **(JINR—10-82-392) Organization of M-6000 computer operation on-line with experimental apparatus.** Aleev, A.N.; Baranovskij, A.I.; Grigalashvili, T.S.; Shumakov, M.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702192.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 1 fig.; 7 tabs.

Data Acquisition System for high-energy experiments is described. CAMAC system, display unit and printer are connected with computer via 4-wire sequential link. This permits to organize work with a remote experimental set up. The data acquisition program is written in assembler language in order to minimize size of memory (3 K words), and to provide high speed. The program can be turned to a new CAMAC configuration and a new structure of hystogrammed data by replacing constants in corresponding tables. It could work both independently, and together with user's program written in fortran, basic or assembler langauges. The program is applied in the experiment on the study of relativistic positronia and for detector calibrating.

44586 **(JINR—13-81-722) Using heat pipes for cooling detectors and preamplifiers inside the vacuum chamber of the accelerator in a spectrometer of recoil nuclei.** Zhidkov, N.K.; Nawrot, A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1981. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702173.

Portions are illegible in microfiche products0 refs.; 4 figs.

The spectrometer of recoil nuclei operating at the Dubna synchrophophasotron is briefly described. The method of cooling semiconducting detector telescopes and preamplifiers of the spectrometer, placed inside a vacuum chamber of the accelerator, by means of heat pipes (HP) is described. The HP basic properties and the peculiarities of their design are presented. The design and technology of making the heat pipes used in the spectrometer are described in detail. The conduction of the heat pipes (6O cm long, 12 mm in diameter, having freon-22 as a heat-transfer agent) is 20-30 times higher than that of copper. The use of the spectrometer in experiments has shown a reliable and effective operation of HP.

44587 **(JINR—13-82-160) Helium streamer chamber with laser track registration at gas pressure up to 5 atm.** Budzyak, A.; Bobrova, N.P.; Zeliger, K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702174.

Portions are illegible in microfiche products3 refs.; 8 figs.; 1 tab.

The main purpose of the paper is the investigation of optimum operation conditions of the helium streamer chamber (HSC) with laser track registration at increased pressure. The emphasis is placed on the problem of high quality of tracks with an introduction of minimum amount of admixtures in order to establish practically pure helium chamber-target. The chamber operation is studied with different methane (0.3-10%) admixtures, water vapours (up to 1% and helium pressure up to 5 atm). It is shown that in order to register with success streamer shadowgraphs in helium the follow-

ing conditions should be accomplished: 1. a streamer chamber is to be carefully cleaned from various impurities; 2. water vapours (0.1-0.8%) are to be introduced into the chamber at small methane admixtures (<1%). A conclusion is drawn that the charged particle track laser registration with a HSC may be successful at helium pressure up to 5 atm with introduction into a chamber minor amounts of methane admixtures and water vapours.

44588 (JINR—13-82-178) On-line electronic system for a multilayer semiconductor spectrometer. Gajsak, I.I.; Gornov, M.G.; Gurov, Yu.B. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702193.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 5 figs.; submitted to the journal Instrum. Exp. Tech.

The "on-line" electronic system multilayer semiconductor spectrometer is described. The system consists of SM-3 minicomputer, CAMAC modules and fast logic modules. The software for system control and data collection is also described. Time resolution of the system is about 60 ns. The energy resolution of a single channel is about 70 keV. The spectrometer is used experimental investigation of negative pion absorption.

44589 (JINR—13-82-180) Surface-barrier detectors made of silicon doped by phosphorus in thermal neutron flux. Gornov, M.G.; Gurov, Yu.B.; Morokhovets, M.A.; Nejmark, K.N.; Osipenko, B.P.; Sandukovskij, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702175.

Portions are illegible in microfiche products2 refs.; 2 figs.; submitted to the journal Instrum. Exp. Techn.

A possibility to fabricate surface-barrier detectors of silicon doped by phosphorus in the thermal neutron flux is investigated. The monocrystals of p-type are used as a starting material. Radiation has been performed in the reactor thermal column with a small admixture of fast neutrons. Annealing of the radiation defects has been made in atmosphere. Stable value of resistivity have been achieved at 600-800 deg C in 1-2 h. It is shown that the detectors made of this material can be used for α-particle, electron and heavy ion spectrometry, the parameters of semiconductor detectors corresponding to the best commercial detectors.

44590 (JINR—13-82-199) $\Delta p/p$ beam particle determining in the MIS installation (JINR). Vishnyakov, V.V.; Ivan'shin, Yu.I.; Sychkov, S.Ya. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 2p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702176.

Microfiche only, copy does not permit paper copy reproduction refs.; 2 figs.

The possibility to match two rectilinear track parts in the beam transport system (before and after charged particle passing through quadrupole magnetic lens) in order to increase efficiency of determining $\Delta p/p$ projectile is investigated. It is shown that the tracks match is performed with 0.94 probability. That increases the efficiency of $\Delta p/p$ determining in the MIS installation (JINR) from 64.7 up to 93.2%.

44591 (JINR—13-82-216) Investigation of characteristics of multistep avalanche chamber. Abdushukurov, D.A.; Zanevskij, Yu.V.; Movchan, S.A.; Netushilova, Z.; Peshekhonov, V.D. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 9p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702177.

7 refs.; 12 figs.

Multistep avalanche chamber is described. The detector performance characteristics obtained on a stand by means of β- and γ-sources are presented. The chamber operation was checked using argon as a working gas with (1-3)% admixtures of acetone, benzene, toluole, propane vapours. It is shown that it is possible to obtain preliminary gain up to 10^5. When using the detector to localize β-radioactivity of ^{14}C, ^{34}S, ^{33}P it is possible to separate zones removed from each other to a 0.5-1 mm distance.

44592 (JINR—13-82-243) Neutron scintillation detector for the time-of-flight spectrometry. Borzakov, S.B.; Vo Van Tkhuan; Pikel'ner, L.B.; Sharapov, Eh.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 4p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702178.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 5 figs.

The neutron scintillation detector is described. It is intended for the neutron time-of-flight spectrometry. The detector efficiency depends weakly on the neutron energy and equals 1-2% for the 1 MeV-1 keV neutrons. The neutron lifetime in the detector is approximately equal to 6 μs. The solid angle equals 3.2π sr in the case of scattered neutron detection.

44593 (JINR—13-82-264) Application of light pipes with large cross sections for transmission of service data image to the photographic film of a hydrogen chamber. Vyskochil, S.; Zernin, Yu.D.; Kovrizhnykh, A.M.; Samsonov, V.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702194.

Portions are illegible in microfiche products8 refs.; 2 figs.; 1 tab.; submitted to the journal Instrum. Exp. Tech.

The investigation results are reported and one of the versions of fibre elements application for transmission of service data image when photographing the hydrogen bubble chamber is presented. The tested light pipes have the cross section 50x25 mm^2, length 500 mm. The service data image obtained by contact method is shown. Photographing with various radii of fibre element deflection are performed and it has been found out that the image structure has not changed i. e. the fibres are sufficiently elastic and in certain deformation limits mechanically are not destroyed. It is concluded that the light pipes may become a basic element of devices for service data formation and transmission in optical mechanical systems in the bubble chamber technique for obtaining film material of high quality.

44594 (JINR—13-82-350) Definition of the structure layers of semiconductor detectors by means of charged particles. Gornov, M.G.; Gurov, Yu.B.; Morokhov, P.V.; Osipenko, B.P.; Pichugin, A.P.; Sandukovskij, V.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702179.

7 refs.; 6 figs.; 3 tabs.; submitted to the journal Instrum. Exp. Tech.

The measuring methods of total thicknesses and sensitive regions of silicon detectors by means of the proton beam and radioactive sources of electrons are accounted. To define these values the dependences of different parameters of the registered spectra on thickness of calibrated silicon filters been used. It simplifies the measurement and eliminates the disadvantages of the known methods. It is apparent that these methods permit to define the geometrical parameters of structure layers of silicon detectors with the accuracy of better than 10 μm which depends only on the stability of the spectrometrical channel.

44595 (JINR—13-82-367) Two-parameter "Time-detector's number" analyzer based on a minicomputer for the KDSOG-M neutron spectrometer. Baluka, G.; Zaleski, I.; Zimin, G.N.; Ishmukhametov, M.Z.; Natkaniec, I.; Chivkin, V.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702180.

7 refs.; 5 figs.

The two-parameter "time-detector's number" analyzer based on a minicomputer designed for the KDSOG spectrometer is described. The analyzer consists of input counters, adder and interface of the SM3101 type core memory. The "+N" type accumulation regime for analysing with a high counting rate is realized. The analyser can be used in any multidetector time-flight spectrometer.

44596 **(JINR—13-82-397) Coaxial detectors from superpure germanium.** Zhargal, Ch.; Kim Zaj Te; Lim Khen Tkhek; Osipenko, B.P.; Revenko, A.V.; Son En Gan; Jurkowski, J. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702181.

Portions are illegible in microfiche products0 refs.; 7 figs.

The technology of fabrication of coaxial detectors from superpure germanium is described. p^+-contact was prepared by the diffusion of In-Ga alloy positioned onto the inner wall of the pit, n-p-transition was due to lithium diffusion at 325 deg C. At 2300 V the electric field intensity near p^+-contact is higher than 100 V/mm, which provides good conditions for carrier collection on electrodes. The energy resolution of prepared detectors for Esub(γ)=122 keV is 1.2 keV, for Esub(γ)=1332 keV-1.9 keV.

44597 **(JINR—16-82-419) Study on the high-energy neutron fluence and dose rate meter response.** Alejnikov, V.E.; Solodilov, A.V.; Timoshenko, G.N.; Hann, G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1982. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702182.

Microfiche only, copy does not permit paper copy reproduction1 refs.; 3 figs.; 1 tab.

The calculations of organic scintillator efficiency using a Monte-Carlo method in the energy range 5-500 MeV are presented. The efficiency dependence on geometry neutron irradiation of detector is studied. The results of experimental examinations of differential characteristics of the detector resonance by neutrons from T(d, n)^{4}He reaction are presented.

44598 **(JINR—19-82-380) Investigation of possibility for using color threshold detectors in the determination of accelerated ion fluence.** Hubner, K.; Erzgraber, G.; Eichhorn, K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702183.

Portions are illegible in microfiche products3 refs.; 8 figs.

A system of foils, which contained polyvenyl alkohol, metylorange, chroralhydrate and tetraboracidal sodium developed for the radiation sterilization, was used for the measurement of the heavy accelerated ion fluence and range. For this aim, spectrophotometrical measurements are performed with detectors of chemically different compositions after irradiation by ^{4}He, ^{12}C, ^{16}O, ^{22}Ne ions. The results are the following: color threshold detectors are suitable for measurements of ion fluence but only in about one order of fluence; they are also suitable for ion measurements of heavy accelerated ion range.

44599 **(JINR—R-10-82-369) Program selection of physical hypothesis in the film information processing system.** Glagolev, V.V.; Govorun, N.N.; Goman, V.S.; Dirner, A.; Ivanov, V.G.; Patocka, I.; Pervushov, V.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702220.

A method of the program selection of physical hypotheses for simplifying the procedure of event identification and decreasing manual work was developed. Its application has accelerated the process of event identification in ^{3}Hep experiment, the number of listings and punch cards has been decreased. It made it possible to organize processing of all events as a united technological scheme. The mathematical data processing has been organized for results of chamber film measurements under computer control.

44600 **(JINR—R-10-82-460) Purpose and the principle of the organization of the automatic system for film information processing (ASMOFI).** Glagolev, V.V.; Govorun, N.N.; Dirner, A.; Ivanov, V.G.; Kretov, A.P.; Shelontsev, I.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702221.

On the base of analysing the defects of traditional systems for film information processing available in JINR, the principles of organization of the automatic system, the introduction of which allows one to raise substantially the speed of the experimental data analysiss have been elaborated. The purpose of the system is organization of data processing control by computer with conservation for users only control functions and performing a small part of operations which owing to the specific character cannot be realized by the computer. The main principles of the system organization are checked in the course of processing of data obtained in the ^{3}Hep-experiment at the one-meter hydrogen liquid bubble chamber.

44601 **(JINR-D—13-82-417) Laser streamer chambers with increased pressure.** Shcherbakov, Yu.A. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems). 1982. 10p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702184.

From 21. International conference on high energy physics; Paris (France) (1982).

Portions are illegible in microfiche products4 refs.; 7 figs.; submitted to the journal Instrum. Exp. Tech.

A new type of the nuclear particles detector - a laser streamer chamber with discharge self-shunting is described. In experiments on studying such detectors small streamer chambers of diameter up to 10 cm and depth of 1-2 cm have been used with transmission illumination. The streamer chambers have been fed from high voltage generators with output voltage from 140 to 400 kV. The typical pulse duration constitutes about 300 ns, pulse rise time - 15 ns. For chamber illumination ultraviolet nitrogen lasers of about 1 μW power have been used. The pulse duration constitutes about 4 ns. Laser radiation with the 337.1 nm wave length has been converted in a gutter with 6G rhodamine into the region of visible wave lengths (570-600 nm). The measurements performed with filling the streamer chamber of the mixture 70% Hf+30% CH_4 under 100 k Pa pressure have shown that the shadowgram from the streamer represents a contrast point of diameter of about 0.2-0.3 mm at the laser delay about 300 ns. It is shown that photographing under the laser regime with a self-shunting chamber allows one to hope to obtain localization (< μm) close to claims raised to modern vertex detectors.

44602 **(JINR-R—7-81-744) Laser ion source for a mass spectrometer.** Arzumanyan, G.M.; Bogdanov, D.D.; Bykovskij, Yu.A.; Rodin, A.M.; Sil'nov, S.M.; Ter-Akop'yan, G.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions). 1981. 7p. (In Russian). (CONF-811255—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702196.

From 3. all-union symposium on scanning electron microscopy and the analytical method of examining solid materials; Zvenigorod, USSR (1 Dec 1981).

Portions are illegible in microfiche products0 refs.; 4 figs.

The design of a mock-up laser ion source intended for the work with "LIDIA" high-sensitive mass-spectrometer by the search of superheavy elements is desribed. The solid state optical quantum LTI PCh-5 generator operating in the mode of electro optical modulation of durability has been used as a source of laser radiation. Laser pulse duration equals 12 ns. The measured energy makes up approximately equal to 3×10^{-2} J at lambda=1.06 μm wave length. The laser permits to operate both in the regime of single passages and at the frequencies of 12.5; 25 and 50 Hz. The focusing has been exercised by a movable lens with F=75 mm focus distance. The density of laser radiation power approaches 2×10^9 W/cm^2. The magnetic spectometer has been designed on the base of SP-57A electromagnet. The angle of ion turn the magnetic field makes up 60 deg, the interpole gap 100 mm, the angles of captute +-5 deg by the horizontal and +-2 deg by the vertical. The spectrometer disperion equals 18 mm/% Brho, resolution A/ΔA approximately equal to 600. Charge and power distributions of C, Al, Ni, Cu, I, Mo, Ta, Pb ions are investigated. Maximum in power distribution of single-charged ions is revealed in the range of ion energies less than 10 eV. Observed is the yield of some molecular ions the maximum of power distribution of which also lies within the range less than 10 eV.

44603 (JINR-R—10-82-211) Program controlled system for mathematical processing the αp-experiment data. Glagolev, V.V.; Govorun, N.N.; Dirner, A.; Ivanov, V.G.; Kretov, A.P.; Mirolyubov, V.P.; Pervushov, V.V.; Shelontsev, I.I. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702199.

Portions are illegible in microfiche products4 refs.; 3 figs.

ZEUS system which allows one mathematical processing of bubble chamber pictures for αp-experiment with computer control is descibed. The comparison and basic defect of traditional processing of film information is considered. The structure, operation and further development of this system are described. It consists of the monitoring programs, directory file, input request language, data bank and documentation. ZEUS system is developed for processing αp-experiment from JINR one-meter-hydrogen liquid chamber. It makes possible to eliminate big manual work at organization of mass data processing by a computer. The system is realized on the CDC-6500 computer.

44604 (JINR-R—10-82-237) Comparative characteristics of program simulators of SHP and HDR special processors for on-line data processing. Ososkov, G.A.; Turzova, M.; Tkhang, T.L. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702219.

9 refs.; 9 figs.

On-line data reduction problem of spark streamer chamber is described. Data reduction is realized using programs simulating two types of processors (special hardware processor and hardware processor for data reduction). For the above problem comparative results for both processes were demonstrated using some criteria of reduction.

44605 (JINR-R—10-82-238) Software development minimum guidance system. Algorithm and specifications of realizing special hardware processor data prefilter program. Baginyan, S.A.; Govorun, N.N.; Tkhang, T.L.; Shigaev, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 26p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702185.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 6 figs.; 1 tab.

Software development minimum guidance system for measuring pictures of bubble chamber on the base of a scanner (HPD) and special hardware processor (SHP) is described. The algorithm of selective filter is proposed. The local software structure and functional specifications of its major parts are described. Some examples of processing picture from HBC-1 (JINR) are also presented.

44606 (JINR-R—11-81-784) Problems of optimal data coding in hodoscopic systems. Nikityuk, N.M. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1981. 13p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702195.

Microfiche only, copy does not permit paper copy reproduction2 refs.; 1 fig.; 1 tab.; submitted to the journal Instrum. Exp. Tech.

An analogy system of algebraic coding theory and of hodoscopic system coding theory is considered. The connection between main parameters of coding devices and parameters of parallel coders applied in hodoscopic systems is established. The efficiency of using a proposed analogy system is illustrated on some examples of designing parallel coders with given properties.

44607 (JINR-R—13-82-374) Low pressure drift chamber in experiment on studies of radiation of relativistic particles in single crystals. Vojtkovska, I.; Golovatyuk, V.M.; Guzik, Z. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702186.

Paper copy only, copy does not permit microfiche production refs.; 8 figs.; submitted to the journal Nucl. Instrum. Methods.

A low pressure drift chamber intended for the study of effects arising at the channeling of high energy particles is described. The reduction of the quantity of the matter in the chamber is performed at the expense of thickness reduction of inlet mylar windows, withdrawal from the particle path of all signal and field forming wires, working pressure reduction in the chamber. The chamber is mounted into the vacuum line of the "Crystal" device, intended for studying the effects arising at channeling of high energy particles. Gas volume of the chamber is limited by mylar windows of 12 μm thickness. The chamber consists of two X-planes and two Y-planes. The creation of the low pressure drift chamber permits to reduce the quantity of the matter on the particle path up to 5×10^{-4} radiation lengths. This gives a possibility to carry out radiation investigations at channeling in fine monocrystals. In the experiment at the "Crystal" device the chamber under 250 torr pressure permits investigations with solution over the inlet angle of +-5 μrad and with solution of +-30 μrad over the outlet angle. The measurement of angular characteristics of the investigated process with such accuracy and reduction of the breaking γ-quanta emerging in the chamber matter permits to obtain reliable results in experiments studying channeling radiation.

44608 (KFK—3391) Testing of the antiwear properties of synthetic engine oils by the use of radionuclide technique. Moeller, H. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Isotopentechnik). Aug 1982. 150p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83750204.

Dissertation submitted to Hannover Univ. (Germany, F.R.).

The antiwear properties of synthetic engine oils are tested at piston lubrication in water cooled passenger-car diesel engines and compared with conventional mineral oils. The radionuclide wear measurement technique (RNT) was used in the examinations performed on the engine test bench. The basic requirements of an oil test technique, which results from the system property of wear and antiwear phenomena, are discussed and set against the special measurement characteristics of the RNT. Requirements on the conduct of oil tests based on the RNT as well as a delimitation of the statement concerning the test result are derived from the theoretical consideration. The serial testing of the oils in one testing engine allows a direct quantitative comparison of the antiwear properties. The test results which are partly different for the two types of test motors used, were explained by differing wear mechanisms occuring in the lubrification of the running surfaces of piston rings and cylinders. Individual tests on the antiwear behaviour under conditions of aging, in cold operation of the engine and on the efficiency of antiwear additives produced differentiated statements concerning the wear and antiwear phenomena in piston lubrication.

44609 (KFKI—1982-41) Investigation of thermal neutron sensitivity of LiF-TL detectors for routine personnel dosimetry at the thermal column of the ZR-4 reactor. Szabo, P.P.; Palfalvi, J. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Jul 1982. 32p. (In Hungarian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701817.

At the thermal column of the ZR-4 research reactor of the Central Research Insitute for Physics the neutron sensitivities of the LiF chips with natural isotopic abundance and ^{7}LiF (TLD-700 powder) thermoluminescent dosimeters were investigated. The thermal and intermedier neutron fluenses were measured by activation gold foils and by solid state nuclear track detectors. The thermal neutron sensitivities of the LiF chips and ^{7}LiF (TLD-700) powder were found to be 2.26 Gy and 22.5 mGy respectively at a thermal neutron fluens of 10^{10} nxcm^{-2}. These results were compared to others found in the literature. At the same time the intermedier neutron sensitivities of these TLDs were also investigated (the energy of neutrons varied form 0.5 eV to 10 keV and their spectra were thought to be 1/E). According to the preliminary results the intermedier neutron sensitivites of these TLDs are in the same order as their thermal neutron sensitivities.

44610 (KFKI—1982-45) Further development of detector-movement control electronics of whole-body counters. Urban, J.; Andrasi, A. (Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics). Jul 1982. 14p. (In Hungarian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701818.

During the reconstruction of the low background whole body counter of the Health Physics Department its services were extended. Using one or two detectors it is possible to carry out measurements in autonomous or computer controlled mode, when simple or profile scanning measurements can be made both longitudinally and transversally. The data are collected by EMG analyser or a CAMAC system and the processing is made off-line or on-line by a computer. In the first part of the work the authors solved the autonomous measuring and movement control, which can be used later as a peripheral of the CAMAC system controlled by the PDP 11/34 computer. In this paper the user's needs, the design of the whole measuring and control system and the details of the realization of the movement control are described.

44611 (KFTI—82-17) Software for data processing from telescope of magnetostriction spark chamber in real time on the M-6000 computer. Vajsfel'd, A.M.; Zinov'eva, O.G.; Tenishev, A.Eh. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702188.

8 refs.; 2 figs.

The description of software of automated data reception from wire spark chambers (WSC) by the computer is given. The data reception through the data transfer system (DTS) is realized by the M 6000 minicomputer in real time. In the course of software of reception and primary data processing specific conditions of the experiment at the linear electron accelerator: pulse frequency of the accelerator 50 Hz, fast response 400 kHz, storage capacity 16 K, set of peripheral facilities (photoinput, printing facility) M-6000, maximum data stream, one event for accelerator pulse up to 4000 words/s. Spark chambers software (SCS) is presented. The program is written in the MNEMOCOD in the basic control system and consists of subprograms interconnected through common memory. Operation of each of the subprograms is considered.

44612 (KIYI—81-9, pp 13-14) Cadmium telluride detector crystals, alloyed by chlorine. Arkad'eva, E.N.; Matveev, O.A.; Mel'nikova, E.V.; Terent'ev, A.I. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.

In Prospect materials and new methods for formation of active elements of semiconductor detectors.

Mobilities and lifetimes of charge carriers depending on the concentration of introduced chlorine and on purity of Cd and Te initial components have been studied as well as the level energy spectra in the most pure crystals have been investigated.

44613 (KIYI—81-9, pp 15-17) Application of the arsenide-gallium detectors in X-ray radiometric analysis. Golenetskij, S.P.; Zaletin, V.M.; Nozhkina, I.N.; Protasov, I.I. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

Paper copy only, copy does not permit microfiche production refs.; 2 figs.

In Prospect materials and new methods for formation of active elements of semiconductor detectors.

Some possibilities of the application of GaAs semiconductor detectors for the X-ray radiometric analysis (XRA) of chemical elements with Z=23-63 have been studied using K series of their characteristic radiation and with Z>=54 using L series. The characteristic radiation is excited by X-ray quanta of a standard source with Cd-109 isotope of 3 mCi activity as well as by beta particles of an open source with Pm-147 isotope of 100 mCi activity.

44614 (KIYI—81-9, pp 18-20) Semiconductor receivers of the pulse X-radiation based on cadmium telluride. Ryvkin, S.M.; Matveev, O.A.; Maslova, L.V.; Karpenko, V.P.; Kasherininov, P.G.; Terent'ev, A.I. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 1 fig.

In Prospect materials and new methods for formation of active elements of semiconductor detectors.

The investigation into the kinetics of induced conductivity of X-ray pulse radiation on the basis of semiisolating crystals of cadmium telluride in the cases of "longitudinal" and "transverse" photoconductivities has been carried on. It is shown that the photocurrent kinetics shape, when illuminating the specimens with rectangular pulses of fundamental light, considerably differ in the case of the "longitudinal" (light is directed along the electrical field in the detector) and "transverse" (light and the electric field are perpendicular) photoconductivities.

44615 (KIYI—81-9, pp 28-30) Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement. Slapa, M.; Trachik, M.; Khvashchevska, Ya.; Charnatski, V.; Shimchik, V.; Yanson, R. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

Microfiche only, copy does not permit paper copy reproduction figs.

In Prospect materials and new methods for formation of active elements of semiconductor detectors.

It is necessary to use small-size devices for the counting and spectrometry of the ionizing radiation to solve problems of medicine and biology. Silicon diffusion-drift detectors as well as detectors of cadmium telluride and mercury iodide have been developed for this purpose; together with the Polon company developed were electron apparatuses permitting to count and to perform spectrometric measurements of beta, roentgen and gamma radiations without the detector cooling at a lower energy threshold of about 5 keV.

44616 (KIYI—81-9, pp 35-37) Amplitude spectra formation in the GaAs radiation detectors. Bukki, S.M.; Zaveryukhin, V.N.; Shchebiot, U.V.; Yafasov, A.Ya. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

Paper copy only, copy does not permit microfiche production refs.; 2 figs.

In Prospect materials and new methods for formation of active elements of semiconductor detectors.

Amplitude spectra formation processes have been experimentally investigated in detectors on the basis of semiisolating gallium arsenide when recording alpha particles of ^{238}Pu and ^{241}Am collimated sources. The defects were made of GaAs crystals of AGP-1 brand with specific resistance of 10^7-10^8 Ohmxcm.

44617 (KIYI—81-9, pp 44-46) X-radiation and soft gamma radiation detectors on the base of HgJ_2 crystals. Zaletin, V.M.; Mal'kovskij, A.S.; Fomin, V.I.; Nozhkina, I.N.; Shustov, N.V. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 1 fig.

In Prospect materials and new methods for formation of active elements of semiconductor detectors.

Fitness of HgI_2 crystals grown with different methods for their usage as the basis of spectrometric detectors for roentgen and soft gamma radiations is evaluated. Studied were the crystals grown by the following methods: a) from the HgI_2 saturated solution in acetone; b) from a gaseous phase using the standard static method; c) by iodine-over saturation static method; d) from a gaseous phase using the oscillating temperature method.

44618 (LA—9350-M) Operation manual: mini-segmented gamma scanner. Johnson, K.J. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 43p. NTIS, PC A03/MF A01. Order Number DE83014806.

An operation and maintenance manual for a microcomputer-controlled segmented gamma scan table is presented. It has a high step and position resolution and a high degree of mechanical and electronic stability. The specifications are presented along with operating instructions, circuits, and software.

44619 (LBL—15381) Recent advances in high-speed photon detectors. Leskovar, B. (Lawrence Berkeley Lab., CA (USA)). 9 Dec 1982. Contract AC03-76SF00098. 10p. (CONF-830673—1). NTIS, PC A02/MF A01. Order Number DE83014862.

From 6. international congress and trade fair - laser 83 Optoelektronik; Munich, F.R. Germany (27 Jun 1983).

Recent progress of some fast high-gain photon detectors using photoemission and secondary emission processes is reviewed and summarized. Specifically, performance characteristics are presented, of the new Amperex XP 2020, RCA 8854, and Hamamatsu R 647-01 conventionally design photomultipliers. Also, characteristics are presented of the ITT F 4129 and Hamamatsu R 1564U extended lifetime microchannel plate photomultipliers as well as certain special made photomultipliers intended for application in positron emission tomography, high energy physics and plasma diagnostic experimental systems. Finally, microchannel plates as photon detectors for ultra violet and x-ray wavelengths are discussed.

44620 (LBL—15676) CAMAC interface for TPC data-acquisition electronics. Sidman, S.; Olson, S.; Jared, R. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 7p. (CONF-830576—8). NTIS, PC A02/MF A01. Order Number DE83014861.

From Real-time computer applications in nuclear and particle physics conference; Berkeley, CA, USA (16 May 1983).

Portions are illegible in microfiche products.

The Time Projection Chamber (TPC) is a detector used for high-energy physics research at the Stanford PEP Accelerator. TPC requires about 17,000 channels of data acquisition, which samples on command the input to each channel at a 10 MHz rate. This high data rate is made possible by means of Charge Coupled Devices (CCDs), intelligent digitizers, and a sophisticated trigger system. The TPC-CAMAC interface described here was developed to allow experiments of smaller scale than the complete TPC to use the standard data acquisition portion of the TPC electronics, namely the amplifier, CCD and digitizer bins. These three bins, when properly interconnected and controlled by the interface control bin, form a transient digitizer with a depth of 455 samples and a maximum width of 256 channels per bin set.

44621 (NRCN(TN)—044) Fading and buildup in TLD-100 cards used for personal dosimetry. Yona, S.; German, U.; Weiser, G. (Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev). May 1982. 10p. (In Hebrew). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701819.

The contributions of natural background and fading to the radiation doses evaluated by TLD-100 cards were investigated. The experiments were performed during a period of six months, and the results indicate that these contributions are significant. It is recommended that the correction factors will be determined exactly, by performing another experiment, in order to reduce the inaccuracies in personnel exposure evaluation by the TLD method.

44622 (RL—82-038) High resolution energy analysers for the 'High Throughput Inelastic Spectrometer'. Penfold, J. (Science Research Council, Chilton (UK). Rutherford and Appleton Labs.). Apr 1982. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701823.

Calculations of energy transfer resolution and count rate for different filter materials and various high resolution energy analysers for the 'High Throughput Inelastic Spectrometer', HTIS, on the SNS, are presented. A graphite filter is shown to be complementary to the existing beryllium filter analyser, improving the energy transfer resolution for energy transfers <approximately equal to 50 meV. Narrow energy band pass analysers are shown to be limited in energy transfer resolution by variations in the scattered flight path, rather than by the intrinsic band widths. The Be/MgO difference filter provides improved energy transfer resolution and high count rates over a wide range of energy transfers, and is felt to be the most appropriate high resolution energy analyser for HTIS.

44623 (RL—82-071) PIPIN users guide: a users guide to the omicron Data Aquisition system. Clark, S.A. (Science Research Council, Chilton (UK). Rutherford and Appleton Labs.). Aug 1982. 32p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702224.

The report is a user's guide to the program PIPIN, a program for Data Aquisition and Monitoring of the experiment SC-94 ($\pi N -> \pi \pi N$).

44624 Neutron detection apparatus. Kopp, M.K.; Valentine, K.H. (to Dept. of Energy). US Patent 4,390,786. 28 Jun 1983. Filed date 24 Apr 1981. vp.

PAT-APPL-257031.

An atomic fission counting apparatus used for neutron detection is provided with spirally curved electrode plates uniformly spaced apart in a circular array and coated with fissile material.

4402 Radiation Effects On Instrument Components, Instruments, Or Electronic Systems

REFER ALSO TO CITATION(S) 44315

44625 (IFVE-OEF—82-6) Study on the characteristics of lead-glass γ-spectrometer radiators irradiated by high energy particles. Inyakin, A.V.; Kakauridze, D.B.; Lednev, A.A.; Prokoshkin, Yu.D.; Sin'govskij, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 11p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702197.

Portions are illegible in microfiche products0 refs.; 4 figs.; 1 tab.; submitted to the journal Instrum. Exp. Tech. and Nucl. Instr. and Meth.

For the purpose of enchancing the operation reliability of precision hodoscopic spectrometers changes in the transparancy of F8-00 type lead-glass radiators being close to F2 European standard, TF1-000 close to SF-2 and F101 (F8 class radiation resistant glass) have been studied. The mesurements are performed on proton beam at 70 GeV with intensity of 10^{10}-10^{11} protons in a cycle. F8-type glass radiators irradiated by π-meson beam at 30 GeV have been also investigated. Universal dependences describing deterioration and restoration of radiator transparancy upon irradiation and change in spectrometer counters characteristics. It is shown that the radiation resistance of the TF-1-type glass is 1.4 times less than of F8-type which in its turn is 60 times less than of F101-type glass. To avoid losses in energy spectrometer resolution, radiators which are suject to the most intensive irradiation (usually in the central part of the detector, in the beam zone), are to be manufactured from radiation-resistant lead glass as well as to liberate the detector of the substance on the beam path. Such measures have been realized, for example, in GAMS-2000 and GAMS-4000 spectrometers which permits to expose them for a long period in the beams with intensity up to 2 x 10^7 pions per cycle.

44626 (SAND—83-0479C) Transient response of GaAs microwave power FET to x-ray pulses. Armendariz, M.G.; Castle, J.G. Jr. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 15p. (CONF-830769—1). NTIS, PC A02/MF A01. Order Number DE83015103.

From 2. annual conference on hardened electronics and radiation technology; Oak Ridge, TN, USA (21 Jul 1983).

Portions are illegible in microfiche products.

The primary purpose of this work is to measure the dependence of the time to recover normal microwave output and of the peak photocurrents in state-of-the-art GaAsFETs on the incident flux of x-rays and on circuit loading. The scope of this report includes a comparison of the observed device responses for the medium power GaAsFET AT8150 operated in different test circuits at x-ray intensities up to 9E10 rads(Si)/s.

44627 (SAND—83-0653C) SNAP-BACK: a stable regenerative breakdown mode of MOS devices. Ochoa, A. Jr.; Sexton, F.W.; Wrobel, T.F.; Hash, G.L.; Sokel, R.J. (Sandia National Labs., Albuquerque, NM (USA); INMOS, Colorado Springs, CO (USA)). 1983. Contract AC04-76DP00789. 11p. (CONF-830714—9). NTIS, PC A02/MF A01. Order Number DE83013993.

From 20. IEEE annual conference on nuclear and space radiation effects; Gatlinburg, TN, USA (18 Jul 1983).

N-channel MOS transistors used in nMOS and in CMOS microelectronic circuits have a drain-to-source breakdown characteristic showing a negative resistance region. Activating this mode of operation leads to a drop in source-to-drain voltage and to a large drain current. Snap-back is not a four-layer (SCR, latch-up) phenomenon, but, like latch-up, can be initiated by current injection into the p-well, by avalanching junctions or by exposure to ionizing radiation. The sustaining voltage can be significantly below the drain-substrate avalanche voltage thereby limiting the maximum operating voltage. In this paper we present a qualitative model for snap-back - local conductivity modulation occurs in the intrinsic base region of the parasitic bipolar transistor leading to regenerative feedback. Effects of process variations on the snap-back characteristics are presented as are triggering sensitivities to ionizing radiation.

44628 (SAND—83-1433C) Comparison of analytical models and experimental results for single-event upset in CMOS SRAMs. Mnich, T.M.; Dichl, S.E.; Shafer, B.D. (Sandia National Labs., Albuquerque, NM (USA); North Carolina State Univ., Raleigh (USA)). 1983. Contract AC04-76DP00789. 10p. (CONF-830714—6). NTIS, PC A02/MF A01. Order Number DE83013990.

From 20. IEEE annual conference on nuclear and space radiation effects; Gatlinburg, TN, USA (18 Jul 1983).

Portions are illegible in microfiche products.

In an effort to design fully radiation-hardened memories for satellite and deep-space applications, a 16K and a 2K CMOS static RAM were modeled for single-particle upset during the design stage. The modeling resulted in the addition of a hardening feedback resistor in the 16K remained tentatively unaltered. Subsequent experiments, using the Lawrence Berkeley Laboratories' 88-inch cyclotron to accelerate krypton and oxygen ions, established an upset threshold for the 2K and the 16K without resistance added, as well as a hardening threshold for the 16K with feedback resistance added. Results for the 16K showed it to be hardenable to the higher level than previously published data for other unhardened 16K RAMs. The data agreed fairly well with the modeling results; however, a close look suggests that modification of the simulation methodology is required to accurately predict the resistance necessary to harden the RAM cell.

4403 Miscellaneous Instruments

REFER ALSO TO CITATION(S) 43763, 44324, 44766, 45186, 45315

44629 (CEA-CONF—6394) High speed motion-picture photography. Instrumentation and application. Bertin-Maghit, G.; Delli, C.; Falgayrettes, M. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)). 1981. 9p. (In French). (CONF-811269—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701821.

From National Association of Technical Research colloquium on high speed movies instrumentation and applications; Paris, France (9 Dec 1981).

Filming technology at 5,000 frames/second is presented in this paper for the determination of the volume and the expension speed of a gas bubble in water. The high speed 16 mm movie camera, fitted with ultra-wide angle lenses, is placed in front of a side light facing the bubble. Ten 60 ms fast flashes, released in succession, illuminate the bubble.

44630 (CEA-N—2301) Optical fibers and their instrumentation applications. Boisde, G. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)). Sep 1982. 62p. (In French). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701822.

The use of optical fibers in instrumentation requires a knowledge of their properties as "photon carriers" and "sensors". New instrumentation design implies a satisfactory evaluation of the entire measurement circuit, including the emitter, optical coupling, optical fiber with its physical, spectral and physico-chemical properties, the connector, receiver, signal amplifier and data processing system. An example, is provided of the development of a new technique in physico-chemical instrumentation: remote spectrophotometry. Three aspects are discussed: 1) industrial measurement in "process control" using the Telephot (R), 2) remote spectral measurement, 3) opical multiplexing. This is followed by a review of various optical fiber based instrumental techniques used in the fields of medicine (endoscopy, fluorothermy, laser surgery), solar energy industrial applications subject to electrical disturbances (position sensors, strain measurements), and in physico-chemical analysis (fluorescence, redox potentials).

44631 (CONF-830666—3) Laser techniques for extreme-ultraviolet spectroscopy. Harris, S.E.; Young, J.F.; Caro, R.G.; Falcone, R.W.; Holmgren, D.E.; Walker, D.J.; Wang, J.C.; Rothenberg, J.E.; Willison, J.R. (Stanford Univ., CA (USA). Edward L. Ginzton Lab.). Jun 1983. Contract AC08-83DP40178. 7p. NTIS, PC A02/MF A01. Order Number DE83014834.

From 6. international conference on laser spectroscopy; Interlaken, Switzerland (27 Jun 1983).

In this paper we describe several techniques for using lasers to study core-excited energy levels in the spectral region between 10 eV and 100 eV. We are particularly interested in levels that are metastable against autoionization and, in some cases, against both autoionization and radiation.

44632 (IFVE-ONF—82-85) Some characteristics of the CCD-321 instruments with charge connection. Evgrafov, G.N.; Lumpov, V.N.; Shuvalov, R.S.; Serdzhiapm'etri, F.; Cherry, K. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 17p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702191.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 2 figs.; 1 tab.

The influence of operating modes of the CCD-321 instruments with charge coupling (ICC) of the Fairchild company on the linearity and transfer inefficiency is investigated. It is shown that there exist zones of variation of mode potentials inside which nonlinearity and inefficiency remain less than some admissible Values. The boundaries of these zones are connected with amplitude and polarity of input signals, nonlinearity and transfer inefficiency by simple relations. The influence of frequency and driving pulse edge on the transfer inefficiency is also investigated.

44633 (INIS-mf—7667) Investigation into the organisation and structural design of multi-computer process-control systems. Gertenbach, W.P. (Natal Univ., Durban (South Africa). Dept. of Electronic Engineering). Dec 1981. 413p. NTIS (US Sales Only), PC A18/MF A01. Order Number DE83780927.

Thesis.

A multi-computer system for the collection of data and control of distributed processes has been developed. The structure and organisation of this system, a study of the general theory of systems and of modularity was used as a basis for an investigation into the organisation and structured design of multi-computer process-control systems. A multi-dimensional model of multi-computer process-control systems was developed. In this model a strict separation was made between organisational properties of multi-computer process-control systems and implementation dependant properties. The model was based on the principles of hierarchical analysis and modularity. Several notions of hierarchy were found necessary to describe fully the organisation of multi-computer systems. A new concept, that of interconnection abstraction was identified. This concept is an extrapolation of implementation techniques in the hardware implementation area to the software implementation area. A synthesis procedure which relies heavily on the above described analysis of multi-computer process-control systems is proposed. The

above mentioned model, and a set of performance factors which depend on a set of identified design criteria, were used to constrain the set of possible solutions to the multi-computer process-control system synthesis-procedure.

44634 (INIS-mf—7685, pp vp) **Parameters influencing the collection efficiency of solid aerosols in cascade impactor.** Boulaud, D.; Diouri, M.; Madelaine, G. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Lab. de Physique de l'Atmosphere). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

The calibration of the Mark II ANDERSEN impactor brought out the following conclusions: The nature of the collection surface is very important. The parasitic effects of particles bounce and blow-off are reduced by using grease coated plates. The aerosol mass previously deposited on the collection plates are also very important. Collection efficiency curves are slightly modified when the mass loading reach 5 mg but this modification remains acceptable until 40 mg. The electrostatic effect is weak when the number of charges is below 1000 by particles. In optimal conditions sharp cut-off was obtained for all stages. The comparison between theoretical and experimental results shows that they are in good agreement (except for the first stage).

44635 (INIS-mf—7685, pp vp) **Equivalence of low pressure impactor and differential mobility analyzer data for submicron particle size distributions.** Reischl, G.P. (Vienna Univ. (Austria). Inst. fuer Experimentalphysik). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Published in summary form only.

44636 (INIS-mf—7685, pp vp) **Real-time aerodynamic particle size analyzer.** Agarwal, J.K.; Remiarz, R.J.; Quant, F.R.; Sem, G.J. 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

This paper describes a new commercial real-time aerodynamic particle size analyzer. In this instrument, the particles first acquire a velocity which is related to their aerodynamic diameter. The velocity of each particle is then measured by using a laser velocimeter.

44637 (JINR—10-82-140) **Basis software for microprogrammed channel controller for operation on-line with experimental physical installations.** Shtrajt, Eh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702205.

Microfiche only, copy does not permit paper copy reproduction refs.; 3 tabs.

The method for composition of programs for the MKK 880 M microprogrammed channel controller is described. Examples of using the software under consideration for some standard operations with CAMAC equipment are given. The suggested method appreciably decreases the time of preparing and debugging the programs for data transmission between the ES-1040 computer and an experimental installation.

44638 (JINR—10-82-144) **Unified system for information exchange between the ES-1040 computer and physical equipment via the MKK 880M controller.** Sadovnikov, V.N.; Shtrajt, Eh. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702206.

Portions are illegible in microfiche products. Original copy available until stock is exhausted refs.; 3 figs.

The structure of the system for information exchange between the EC-1040 computer and physical apparatus is given. The interaction between computer programs, channel program for MKK-880-M and physical apparatus in real time systems is demonstrated. The ways for generation of channel program for a specialized physical experiment is described.

44639 (LA-UR—83-1699) **Use of fiber optics and laser-induced fluorescence for remote measurements of UF_6 in strong rotation.** Allison, S.W.; Magnuson, D.W.; Cates, M.R.; Gentry, R.A.; Caldwell, S.E.; Franks, L.A.; Nelson, M.A.; Davies, T.J. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 32p. (CONF-830642—4). NTIS, PC A03/MF A01. Order Number DE83014195.

From 5. international workshop on gases in strong rotation; Charlottesville, VA, USA (6 Jun 1983).

Portions are illegible in microfiche products.

Laser-induced fluorescence (LIF) and other laser-based techniques are being employed in an increasing number of gas and flow field diagnostic applications. In some instances, the necessary instrumentation requires unavailable space and is not portable. Sometimes the process region of interest is relatively inaccessible. These factors complicate and hinder deployment of laser diagnostic techniques. A fiber optics based method for delivering the laser and for returning optical signals can be used to circumvent these problems. Reported here is a demonstration of a fiber optics system for remote monitoring of UF_6 density and temperature by the LIF method. The description consists of a discussion of a fiber system that conveys the laser beam to the points of interest and a fiber system which transmits the LIF signal to a photomultiplier tube. Representative results from a static gas cell and a centrifuge are presented.

44640 (RISO-M—2344) **Write-up for the diffractometer D1 at Risoe.** Bundgaard, J.; Krebs Larsen, F.; Lebech, B.; Nielsen, M.H.; Skaarup, P. (eds.). (Risoe National Lab., Roskilde (Denmark)). May 1982. 120p. NTIS (US Sales Only), PC A06/MF A01; Also available from Risoe Library, DK-4000 Roskilde, Denmark. Order Number DE83701061.

Manual for the crystallographic program system used to control the 4-circle neutron diffractometer D1/TASII at DR3, Risoe. The mechanical part of the diffractometer consists of a monochromator part which allows an easy change of incident neutron wavelenght and a four-circle HUBER goniostate consisting of an Euler cradle (HUBER 512) and two horizontal goniometers (HUBER 440 and HUBER 430). The goniostate is computer controlled by a PDP-11/34 interfaced via CAMAC modules. The PDP-11/34 computer has a 128 k byte memory, two hard magnetic disc stations, a fast DEC-writer terminal and a screen terminal. The diffractometer can be operated remotely via modem and telephone line connections from remote stations such as the University of Aarhus and ILL, Grenoble. Minor parts of the software used to control the diffractometer were developed at Risoe while the major parts were a generous gift to Risoe from College 5, the diffraction group, at the Institute Laue-Langevin, Grenoble, France.

44641 (SAND—82-1730) **Systems approach to measuring short-duration acceleration transients.** Schelby, F. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 22p. NTIS, PC A02/MF A01. Order Number DE83015357.

A shock measurement system was developed in which the quartz seismic system, 2-pole active filter, and an FET source follower are incorporated in a transducer housing measuring 5/16-in. hex. x 5/8-in. Tests have shown the system will survive +- 100,000 g without damage.

44642 (SAND—82-2280) **Accelerated aging of Wahl Temp-Plate temperature-recording devices.** Mead, K.E.; Martinez, R.J.; Reif, G.R. (Sandia National Labs., Albuquerque, NM (USA)). Jul 1983. Contract AC04-76DP00789. 19p. NTIS, PC A02/MF A01. Order Number DE83015311.

This project was a compatibility study of a proprietary one-shot chemical temperature sensor to gain confidence in its suitability for application on thermal batteries. Sets of samples were subjected to accelerated aging at 80°C in 20 and 50% RH. Results did not provide age-predictive data but gave confidence in the successful application of this particular sensor. An epoxy coating was found to extend the life of the sensors. The adhesive backing does retain the sensors in place. A hot-water-detergent dip often used on battery cases was not detrimental to bonding.

44643 **(SAND—83-1058) Error analysis of thermocouple measurements in the Climatic Facility.** Nakos, J.T.; Strait, B.G.; Navoda, L.P. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 35p. NTIS, PC A03/MF A01. Order Number DE83015415.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

An error analysis is presented for any kind of Chromel-Alumel (Type K) thermocouple (sheathed or unsheathed) that conforms to the ANSI specifications for thermocouple accuracy. Errors treated are those present in essentially every test. The most conservative (largest) value of all errors is used, and the errors are presented in various temperature ranges corresponding to various error specifications. (LEW)

44644 **(UCRL—15541) X-ray microscope design study. Final report.** Augustyn, W.H. (Perkin-Elmer Corp., Norwalk, CT (USA). Electro-Optical Div.). Dec 1975. Contract W-7405-ENG-48. 59p. NTIS, PC A04/MF A01. Order Number DE83014843.

Portions are illegible in microfiche products.

Methods were developed for optical ray tracing and performance calculations for x-ray microscopes to be used at grazing incidence angles less than one degree and for x-rays in the range of 4 A to 50 A. In addition, the resolution requirements for these instruments operating at 6X or greater were to be 1 μm or less over a field of view 1000 μm diameter. With working distances of the order of 0.3m, these microscopes are intended for observation of fuel pellets under irradiation during controlled fusion experiments. This report also forms a technical proposal for the manufacture of one basic form of instrument: 6X magnification, with a fused silica substrate bare, and fused silica coated with platinum or gold or nickel. Recommendations are also made for further study in this area, which will allow optimized designs to be developed for specific applications which are less generalized than were the guidelines for the study.

44645 **(UCRL—88917) Optical shutters using microchannel plate (MCP) intensifier tubes.** Kotecki, D.E.; Lear, R. (Lawrence Livermore National Lab., CA (USA)). Jun 1983. Contract W-7405-ENG-48. 19p. (CONF-830874—7). NTIS, PC A02/MF A01. Order Number DE83014943.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

Optical shutters with exposure times approaching 1 ns have been achieved by gating either the photocathode or the microchannel plate of 18-mm proximity-focused microchannel plate intensifier tubes. We present measurements of the shutter performance, including the total optical gate, uniformity vs time, resolution, linearity, and dynamic range, for a number of intensifier tubes under various types of pulsing configurations. Properties of intensifier tubes related to fast gating and limitations on the gating speed imposed by the intensifier tube geometry are discussed. We also give results with a specially modified intensifer in which all but a 3 mm x 18-mm portion of the photocathode was masked off by an opaque metallic undercoating, along with preliminary results of gating third-generation (GaAs photocathode) intensifier tubes. A characterization procedure used to evaluate the performance of each optical shutter is discussed, along with a review of fast electrical pulsers suitable for gating intensifier tubes.

44646 **(UM-P—82/40) Consequences of the neglect of TDS correction for temperature parameters.** Stevenson, A.W.; Harada, J. (Melbourne Univ., Parkville (Australia). School of Physics). 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701063.

The importance of carrying out TDS corrections in analyses of charge density distributions from x-ray diffraction data is emphasized. Their relative effect on derived temperature parameter values is discussed and shown to rely primarily on the experimental conditions and not on the softness of the crystal.

44647 **Apparatus for the precise measurement of the physical properties of liquids at elevated temperature and pressure.** Nissen, D.A.; Macmillan, D.C. (Exploratory Chemistry Division I, Sandia National Laboratories, Livermore, California 94550). *Review of Scientific Instruments;* **54**: No. 7, 861-867(Jul 1983).

This report describes an instrument designed to measure the viscosity, surface tension, and density of liquids at elevated temperature and pressure. The theoretical principles, details of construction and operation, and response of the instrument are discussed in detail. As an example of the accuracy of the data generated by this instrument, the thermophysical properties of molten $NaNO_3$—KNO_3 have been measured over the temperature range 250—400 °C and are shown to be in excellent agreement with the recommended literature values.

44648 **Electronic method for autofluorography of macromolecules on two-d matrices.** Case, A.L.; Davidson, J.B. (to Dept. of Energy). US Patent 4,389,670. 21 Jun 1983. Filed date 30 Dec 1981. vp.

PAT-APPL-335998.

A method for detecting, localizing, and quantifying macromolecules contained in a two-dimensional matrix is provided which employs a television-based position sensitive detection system. A molecule-containing matrix may be produced by conventional means to produce spots of light at the molecule locations which are detected by the television system. The matrix , such as a gel matrix, is exposed to an electronic camera system including an image-intensifier and secondary electron conduction camera capable of light integrating times of many minutes. A light image stored in the form of a charge image on the camera tube target is scanned by conventional television techniques, digitized, and stored in a digital memory. Intensity of any point on the image may be determined from the number at the memory address of the point. The entire image may be displayed on a television monitor for inspection and photographing or individual spots may be analyzed through selected readout of the memory locations. Compared to conventional film exposure methods, the exposure time may be reduced 100-1000 times.

44649 **Coded aperture imaging with self-supporting uniformly redundant arrays.** Fenimore, E.E. (to Dept. of Energy). US Patent 4,389,633. 21 Jun 1983. Filed date 26 Sep 1980. vp.

PAT-APPL-191192.

The present invention utilizes holes which are an integer times smaller in each direction than holes in conventional ura patterns. A balance correlation function is generated where holes are represented by 1's, nonholes are represented by -1's, and supporting area is represented by 0's. The self-supporting array can be used for low energy applications where substrates would greatly reduce throughput. The balance correlation response function for the self-supporting array pattern provides an accurate representation of the source of nonfocusable radiation.

44650 **Measurement of peak temperature along an optical fiber.** Fox, R.J. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Applied Optics;* **22**: No. 7, 967-969(1 Apr 1983). Contract W-7405-ENG-26.

A multimode silica-clad optical fiber with a liquid silicone core was used as a distributed-line peak-temperature sensor over a temperature range from ambient to 190 °C. The maximum error was 2 °C and was essentially independent of the length or position of the hot zone.

4404 Well Logging Instrumentation

44651 **Head assembly for multiposition borehole extensometer.** Frank, D.N. (to Dept. of Energy). US Patent 4,382,335. 10 May 1983. Filed date 9 Jun 1981. vp.
PAT-APPL-271752.

A head assembly for a borehole extensometer and an improved extensometer for measuring subsurface subsidence. A plurality of inflatable anchors provide discrete measurement points. A metering rod is fixed to each of the anchors which are displaced when subsidence occurs, thereby translating the attached rod. The head assembly includes a sprocket wheel rotatably mounted on a standpipe and engaged by a chain which is connected at one end to the metering rod and at the other end to a counterweight. A second sprocket wheel connected to the standpipe also engages the chain and drives a connected potentiometer. The head assembly converts the linear displacement of the metering rod to the rotary motion of the second sprocket wheel, which is measured by the potentiometer, producing a continuous electrical output.

45 EXPLOSIONS AND EXPLOSIVES

4502 Nuclear

REFER ALSO TO CITATION(S) 44722

44652 **(ANL/EES-TM—227-Vol.2) Preliminary evaluation of crisis-relocation fallout-shelter options. Volume 2. Detailed analysis.** Santini, D.J.; Clinch, J.M.; Davis, F.H.; Hill, L.G.; Lynch, E.P.; Tanzman, E.A.; Wernette, D.R. (Argonne National Lab., IL (USA)). Dec 1982. Contract W-31-109-ENG-38. 104p. NTIS, PC A06/MF A01. Order Number DE83015768.

This report presents a preliminary, detailed evaluation of various shelter options for use if the President orders crisis relocation of the US urban population because of strong expectation of a nuclear war. The availability of livable shelter space at 40 ft² per person (congregate-care space) by state is evaluated. Options are evaluated for construction of fallout shelters allowing 10 ft² per person - such shelters are designed to provide 100% survival at projected levels of radioactive fallout. The FEMA concept of upgrading existing buildings to act as fallout shelters can, in principle, provide adequate shelter throughout most of the US. Exceptions are noted and remedies proposed. In terms of upgrading existing buildings to fallout shelter status, great benefits are possible by turning away from a standard national approach and adopting a more site-specific approach. Existing FEMA research provides a solid foundation for successful crisis relocation planning, but the program can be refined by making suitable modifications in its locational, engineering, and institutionally specific elements.

4503 Explosion Detection

44653 **(FOA-C—20443-T1) Common data base experiment: revised event bulletin.** Ohlsson, H. (Foersvarets Forskningsanstalt, Stockholm (Sweden)). Feb 1982. 31p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83902605.

During the Common Data Base Experiment (CDBE), which took place in October 1980, seismic data were collected from a number of globally distributed stations and analyzed at the National Defense Research Institute in Stockholm. The data were collected during the time period October 1 to 15 with the contribution of bulletins, so called level I data, from 59 stations in 21 countries and waveform data, so called level II data, from 58 stations in 13 countries. The event list presented here is a revised version of the list presented in a progress report and at the Committee on Disarmament Seismic Expert Group meeting in Geneva 1981.

50 ENVIRONMENTAL SCIENCES, ATMOSPHERIC

5001 Basic Studies

44654 (CONF-721002—, pp 114-127) **Status of air quality simulation modeling.** Johnson, W.B. (Environmental Protection Agency, Research Triangle Park, NC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The role of air quality simulation modeling in air pollution control activities is described with reference to the function of other related models. The major requirements in the planning and operations areas are discussed. The formulations, advantages and disadvantages of five main types of models (Gaussian, fixed-cell, moving cell, particle-in-cell, and multiple box) are reviewed, as well as the general difficulties and limitations encountered. Areas needing more research effort are indicated. Current EPA modeling activities with regard to development, evaluation and application are described. Finally, program funding levels for outside modeling research are discussed.

44655 (CONF-721002—, pp 128-144) **Atmospheric modeling and environmental protection needs.** Knox, J.B. (Lawrence Livermore National Lab., CA). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

An overview of the art of modeling complex earth atmospheres is presented with individualized programs appended for: Air Resources Atmospheric Transport and Diffusion Laboratory; Air Resource Laboratory, National Reactor Development Station; ARL-Washington; Argonne National Laboratory; Brookhaven National Laboratory; Health and Safety Laboratory; Los Angeles Scientific Laboratory; Lawrence Livermore Laboratory; and Pacific Northwest Laboratories. (PSB)

44656 (INIS-mf—7685, pp vp) **Natural ion concentration in air as an indication of atmosphere pollution by nanometer aerosol particle.** Drozdowicz, B.; Niziol, B.; Wandzilak, P.; Wcislak, L. (Uniwersytet Jagiellonski, Krakow (Poland). Inst. of Nuclear Physics); Jura, Z. 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

The relation between natural ion concentration in air and atmosphere pollution by ultrafine aerosol particles has been shown. The notion ion in this paper applies to charged atoms and molecules of gaseous air component and charged aerosol particles present in air. On the ground of electrical mobility value a classification of ions present in atmospheric air has been carried out.

44657 **Observations and models of simple nocturnal slope flows.** Doran, J.C.; Horst, J.W. (Pacific Northwest Laboratory, Richland, WA 99352). *Journal of the Atmospheric Sciences;* **40**: No. 3, 708-717(Mar 1983). Contract AC06-76RL01830.

Measurements of simple nocturnal slope winds were taken on Rattlesnake Mountain, a nearly ideal two-dimensional ridge. Tower and tethered balloon instrumentation allowed the determination of the wind and temperature characteristics of the katabatic layer as well as the ambient conditions. Two cases were chosen for study; these were marked by well-defined surface-based temperature inversions and a low-level maximum in the downslope wind component. The downslope development of the slope flow could be determined from the tower measurements, and showed a progressive strenghtening of the katabatic layer. Hydraulic models developed by Manins and Sawford (1979a) and Briggs (1981) gave useful estimates of drainage layer depths, but were not otherwise applicable. A simple numerical model that relates the eddy diffusivity to the local turbulent kinetic energy was found to give good

agreement with the observed wind and temperature profiles of the slope flows.

5002 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 43207, 43213, 43223, 43224, 43239, 43294, 43455, 43510, 43736, 44000, 44005, 44006, 44173, 44729, 44742, 44811, 45084

44658 (ANL/EES-TM—212-Vol.4) **In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 4. Federal Regions VIII, IX, and X.** Garvey, D.B.; Moser, S.B.; Streets, D.G. (Argonne National Lab., IL (USA)). Aug 1982. Contract W-31-109-ENG-38. 398p. NTIS, PC A17/MF A01. Order Number DE83014459.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Clean Air Air Amendments of 1977 and US Environmental Protection Agency regulations set stringent requirements for the control of emissions in areas where the National Ambient Air Quality Standards were being exceeded. This second edition of four volumes updates a previous five-volume summary of nonattainment area designations and attainment strategies of the states, bringing the information up to date as of December 31, 1981. This edition also includes state information that was presented in another report prepared as a supplement to the first edition - information on Prevention of Significant Deterioration Class I areas and on coal quality and reserves. In addition, the volumes contain new state-level data on power plants, industrial boilers, 1979 SAROAD monitor readings, state implementation plan emission limits for SO_2 and particulate-matter sources, and maps of counties and Air Quality Control Regions.

44659 (ARI-RP—150) **Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983.** Silver, J.A. (Aerodyne Research, Inc., Billerica, MA (USA). Center for Chemical and Environmental Physics). Jun 1983. Contract AC21-82MC19028. 20p. NTIS, PC A02/MF A01. Order Number DE83014091.

The production of nitric oxide from combustion of hydrocarbon fuels with air has been recognized to be a serious potential health hazard. In dirtier fuels such as coal and oil shale, a major source of nitric oxide occurs due to the reactions of small hydrocarbon fragments with the nitrogen in the air. These reactions take place in the rich part of the combustion flame and are termed the Prompt-NO mechanism. However, the detailed reaction sequence and rates of these reactions are not well known. The purpose of this work is to directly measure key reaction rates of the CH radical and subsequent HCN reactions which form the basis for Prompt-NO production. During this quarter, efforts have been focussed on development of a better source for CH radicals. Work continues to progress on a chemical model to elucidate the key reaction mechanisms affecting the formation of nitric oxide in the rich part of the flame.

44660 (CONF-721002—, pp 198-205) **Monitoring equipment. I. Survey of air monitoring instrumentation.** Hollowell, C.D. (Lawrence Berkeley Lab., CA). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

A brief survey of instrumentation for air pollution monitoring is presented here. Material for this survey has been obtained from the Instrumentation for Environmental Monitoring project currently in progress at the Lawrence Berkeley Laboratory. Several US Atomic Energy Commission and National Aeronautical and Space Agency laboratories have developed capabilities in the area of conventional air monitoring instrumentation. Specific instrumentation projects at the national laboratories are discussed in this paper.

44661 (CONF-721002—, pp 224-235) **Remote sensing of the environment.** Lawrence, J.D. Jr.; Keafer, L.S. Jr. (National Aeronautics and Space Administration, Hampton, VA). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

This paper surveys the capability in remote sensing within the National Aeronautics and Space Administration and Atomic Energy Commission Laboratories emphasizing those aspects which may be helpful to the Environmental Protection Agency. The paper discusses the application of remote sensing and interrogation techniques using various observational platforms to environmental problems and concludes with a look at future research needs.

44662 (CONF-721002—, pp 236-250) **Nuclear and x-ray techniques.** Lyon, W.S. (Oak Ridge National Lab., TN). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Nuclear and x-ray techniques provide some of the most powerful analytical methods available for the examination of environmental pollution samples. A number of the US Atomic Energy Commission and National Aeronautical and Space Agency laboratories have developed capabilities in these areas to the stage where they can now accept assignments from other agencies (such as the Environmental Protection Agency) to perform specific analytical services. This paper discusses a number of these proved techniques that have been applied to environmental problems. Neutron, photon and charged particle activation analysis are examples of nuclear techniques already successfully used in pollution studies. X-ray fluorescence - induced by x-rays or charged particles - can provide elemental analysis at low cost. Electron spectroscopy for chemical analysis can provide specific chemical information about toxic elements. A few specialized techniques are also mentioned: the use of stable isotopes in environmental studies, spark source mass spectrometry for multi-element analysis, and sorption chromatography for the determination of trace organics in water. All of these methods are presently being applied and examples of data obtained from their use are given.

44663 (CONF-8208123—, pp 412-424) **Chemical pathways from stack emissions to surface water.** Kallend, A.S. (Central Electricity Generating Board, Leatherhead Laboratories, Leatherhead, Surrey, UK). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Direct measurements as well as modelling studies based on kinetic parameters determined in the laboratory have resulted in a reasonable understanding of the gas phase chemical transformation of major primary pollutants. The relative abundance of sulphate and nitrate in precipitation does not, however, reflect the measured or predicted rate of production of nitric acid and sulphate aerosol in typical plumes in which gas phase chemistry predominates and suggest that, on average at least, in-cloud chemical transformation along with direct precipitation scavenging accounts for a substantial part of the sulphate actually observed in precipitation at most sites. The chemical interaction of pollutants from the same source and from different sources is brought out most clearly when considering the effect of ambient air composition on the gas phase chemistry in plumes. Equally however, oxidant availability during in-cloud oxidation of SO_2 may be of even greater importance and may sometimes be the rate determining factor for sulphate production. There is a need to investigate the importance of hydrocarbon precursors in this respect. The chemistry of the ambient air is also important at long range, particularly when it is of urban origin, because this air itself contains many of the prinicpal components that are also present in power plant plumes including SO_2, NOsub(x) and their derivatives. Indeed, for NOsub(x) at least after 24 h travel at a distance of approximately 1000 km from source, it may often be the case that most of NOsub(x) in the now widely dispersed and diluted plume derives not from the plume source but from the much more widespread urban or rural sources which determine the quality of the ambient air.

44664 **(DOE/MC/14373—T1) Data reduction for aerosol coagulation experiments with wall loss. Topical report No. 1.** Loos, H.G. (Laguna Research Lab., Laguna Beach, CA (USA)). Jan 1981. Contract AC21-80MC14373. 18p. NTIS, PC A02/MF A01. Order Number DE83015812.

Portions are illegible in microfiche products.

A method is described for the calculation of the aerosol coagulation coefficient and the wall loss coefficient from measured values of the aerosol concentration in an ageing balloon, without the introduction of a linearization or an apparent coagulation coefficient in the manner of Rooker and Davies. The data reduction method constitutes a single grand fit of all the data for one size balloon to a theoretical surface in the space of data $1/n_0$, $1/n$, and t, where n is the aerosol concentration and t is the time. The method may be described as a least squared distances fit, and it uses the metric defined in data space by the noise. The data reduction technique is applied to the Rooker-Davies large balloon data for three types of noise in the aerosol concentration data: fixed standard deviation, fixed relative standard deviation, and Poisson noise. The resulting values for the coagulation coefficient for particles of .005 μm medium radius are respectively 33×10^{-10}, 40×10^{-10}, and 36×10^{-10} cm^3/particle sec, as compared with 51.1×10^{-10} cm^3/particle sec as found by Rooker and Davies.

44665 **(EPA—450/5-82-005) Preliminary study of sources of inorganic arsenic.** (Radian Corp., Durham, NC (USA)). Aug 1982. 320p. Environmental Protection Agency, Research Triangle Park, NC 27711.

The purpose of this study was to examine seven stationary source categories of inorganic arsenic emissions and provide information on each to assist EPA in determining priorities for detailed studies for possible regulatory development. The seven source categories are: primary copper smelters (exclusive of ASARCO-Tacoma), primary lead smelters, primary zinc smelters, secondary lead smelters, glass manufacturing, cotton gins (that handle arsenic acid-desiccated cotton), and arsenic chemical plants. These source categories were examined to determine the magnitude of arsenic emissions corresponding to the current or existing level of control, the magnitude of arsenic emissions resulting from compliance with all applicable regulations, and the magnitude of arsenic emissions resulting from the use of estimated best control (EBC) for arsenic. A potential EBC for each source category was selected based on whether the emitted arsenic was primarily in a particulate or gaseous form, or in a combination of both forms, and whether the technology had been demonstrated as an effective method of arsenic control within the subject or a similar source category. Once an EBC option was selected, the objective was to determine the incremental arsenic emissions reduction achievable over baseline by implementing EBC. The resultant costs of the EBC increment were also determined.

44666 (INIS-mf—7669, pp vp) **Ventilation, filtration and radon.** Jonassen, N. (Laboratoriet for Teknisk Fysik 1, Danmarks Tekniske Hoejskole, Lyngby, Denmark). 1982. (In Danish). NTIS (US Sales Only), PC A09/MF A01. (CONF-8206150—Summ.).

From 12. Nordic heating and ventilation congress; Copenhagen, Denmark (2 Jun 1982).

44667 (INIS-mf—7669, pp vp) **Ventilation control by means of CO_2 determination.** Soedergren, D. (Paul Petersson AB, Stockholm, Sverige). 1982. (In Swedish). NTIS (US Sales Only), PC A09/MF A01. (CONF-8206150—Summ.).

From 12. Nordic heating and ventilation congress; Copenhagen, Denmark (2 Jun 1982).

44668 (INIS-mf—7685, pp vp) **Determination of condensation nuclei using a modified Aitken method.** Kubie, G. (Muenster Univ. (Germany, F.R.). Inst. fuer Medizinische Physik); Schless, D. (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Muenster (Germany, F.R.). Aussenstelle Muenster). 1981. (In German). NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

A test set-up for ultra-microscopic detection of condensation nuclei according to the Aitken-method is described, and it is shown that due to the delay of a video camera tube the video-technique allows to store flashlight shots of condensation particles such as they occur in an expansion cloud chamber. The possibilities resulting from that technique are stated.

44669 (INIS-mf—7685, pp vp) **Analysis of continuous flow condensation nuclei counters.** Metayer, Y.; Perrin, M.L.; Madelaine, G. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Calculations and experimental results exhibit a good agreement. Thus the model develop seems to give an accurate description of the phenomena occuring in the Continuous Flow CNC's. For concentrations larger than 10^4 p.cm^{-3}, the final droplets size decreases and a significant vapor's reduction occurs. This result explains the irregular shape of the factory calibration curve for the large concentrations range. Furthermore, for a concentrated polydisperse aerosol, a dilution technique must be used for meaningful measurements.

44670 (INIS-mf—7685, pp vp) **New approach to the determination of atmospheric strong acids.** Niessner, R.; Klockow, D. (Dortmund Univ. (Germany, F.R.)). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

44671 (INIS-mf—7685, pp vp) **Time sequential sampling and elemental analysis of indoor and outdoor aerosol.** Jupe, H.; Richter, F.W.; Waetjen, U. (Marburg Univ. (Germany, F.R.). Fachbereich Physik). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

The paper deals with aerosol sampling by a so called streaker, elemental analysis by proton induced X-ray emission, comparison of streaker data with high volume data and gives finally an application to urban aerosol investigation.

44672 (INIS-mf—7685, pp vp) **Investigation to the separation efficiency of a cyclone separator using a stray light particle size counting technique.** Mothes, H.; Loeffler, F. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Inst. fuer Mechanische Verfahrenstechnik und Mechanik). 1981. (In German). NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

As part of this work separation efficiency curves and low particle concentrations and particle size distributions in the cyclone separation room were experimentally established on a test cyclone by means of a stray light particle size counting technique. To this effect sampling probes were used to take samples of the dust-loaded gas in the inlet, outlet and separation room of the cyclone partial flows by isokinetic sampling, for which the particle concentration and particle size distribution were obtained with a stray light measuring technique. It was shown that with the stray light measuring device separation efficiency curves can be detected rapidly and with a high sensitivity. During the measurements the cyclone geometry as well as the throughput and the crude gas dust concentration were subject to variations. New perceptions were gained especially concerning the influence of the dust concentration upon the separation efficiency. In addition the experimental results provide valuable hints for the theoretical models; they prove for example that the deterministic model assumption correctly describes the local distribution of the particle sizes in the separation room.

44673 (INIS-mf—7685, pp vp) **Measurement procedure for acquisition of spatial inhomogeneous aerosol concentrations.** Willms, I. (Gesamthochschule Duisburg (Germany, F.R.). Fachgebiet Nachrichtentechnik, Grundgebiete und Bauelemente der Nachrichtentechnik). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

For the acquisition of spatial inhomogeneous distributed aerosols a method has been developed, which is based on the evaluation of a set of optical extinction measurements. The evaluation is accomplished by a modified computer tomographical method. This method is relatively insensible to errors in the input data. Thus even with measurement data gained by means of a simply constructed model of the measurement apparatus evaluable results can be obtained.

44674 (INIS-mf—7685, pp vp) **Aerosol measurement by photon correlation spectroscopy.** Itoh, M.; Takahashi, K. (Kyoto Univ., Uji (Japan). Inst. of Atomic Energy). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

44675 (INIS-mf—7685, pp vp) **Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling.** Niessner, R.; Klockow, D. (Dortmund Univ. (Germany, F.R.)); Fissan, H.; Kapitza, F. (Gesamthochschule Duisburg (Germany, F.R.)). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

In the present paper a sampling method for size related chemical analysis is described which collects particles above 0.7 μm by impaction and separates submicron particles into two fractions by diffusion. The method has been used to investigate the content in sulfate, nitrate and chloride of the three modes of atmospheric aerosol.

44676 (INIS-mf—7685, pp vp) **Aerosol generator for monodisperse Ag- and NaCl-aerosols in the particle size range between 2 nm and 300 nm.** Scheibel, H.G.; Porstendoerfer, J.; Becker, K.H.; Hussin, A. (Goettingen Univ. (Germany, F.R.). Isotopenlaboratorium). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

44677 (INIS-mf—7685, pp vp) **Development of techniques for the preparation of monodisperse solid ferric oxide particles using the May spinning-top aerosol generator.** Mitchell, J.P. (UKAEA Atomic Energy Establishment, Winfrith. Technology Div.). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Modifications have been made to the May spinning-top aerosol generator in order to produce satellite free, monodisperse ferric oxide particles in the size range 1 - 10 μm. The problems encountered during the development work are described in detail and the factors which have been found to influence the reliability of this equipment are emphasised.

44678 (INIS-mf—7685, pp vp) **Commissioning of a commercially available vibrating office aerosol generator.** Boyd, J.V. (UKAEA Atomic Energy Establishment, Winfrith. Technology Div.). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Standard monodisperse aerosols are required for the calibration of aerosol particle size analysers. A commercially available vibrating orifice aerosol generator has been commissioned to produce liquid and solid aerosols in the particle size range 2-30 μm. Various problems have been experienced during the operation of this equipment, particularly regarding the reliable generation of solid aerosols. The performance of the generator is reviewed in terms of the liquid feed, the orifice-jet requirements, the solvent evaporation and the solid aerosol drying characteristics.

44679 **(MST-LUFT-A—55) Plume rise.** Markvorsen, J.S. (Miljoestyrelsen, Roskilde (Denmark). Luftforureningslab.). Dec 1982. 68p. (In Danish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750845.

Plume rise models found in the literature are summarized. The models are tested against nine ordinary point sources with a heat emission ranging from 2 MW to about 90 MW. It is shown that there is a very great discrepancy between some of th models, whereas others are similar. In a following report, the models will be tested against field measurements.

44680 **(MST-LUFT-A—62) Trajectory model with varying mixing height.** Gislason, K.B.; Prahm, L.P. (Miljoestyrelsen, Roskilde (Denmark). Luftforureningslab.). Oct 1982. 43p. (In Danish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750762.

A multibox trajectory model is developed. A puff consisting of SO_2 and SO_4 from a point source on a given effective height above an area is followed. Mass calculation is performed in a number of time steps with evaluation of dry and wet deposition. Mixing height is constant over each single time step. On basis of simplified assumptions there is shown the effect of dry and wet deposition for elimination of SO_2 and SO_4 from the puff of the ground surface. Without wet deposition there remains a considerable part of pollution in the puff (suspension ratio is approximately 50%) after 39 hours from the emission moment regardless of day or night emission. If wet deposition occurs during the whole transport time, then most pollution is deposited (suspension ratio is approximately 15%) after 39 hours. In low mixing height and high source height pollution can be transported over long distance before a puff is mixed in a mixing layer. Calculations assuming the puff to be constantly in the mixing layer result for sources with large effective height in a systematic underestimation of pollution deposited far from the source and overestimation of deposition close to the source. The opposite is true for sources with low emission height.

44681 **(NILU-OR—19/81) Photochemical oxidants in north-western Europe 1976-79. A pilot project.** Schjoldager, J.; Dovland, H.; Grennfelt, P.; Saltbones, J. (Norsk Inst. for Luftforskning, Kjeller). Apr 1981. 89p. NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750849.

Portions are illegible in microfiche products.

Ambient ozone data have been examined from eight countries for the years 1976-79: Austria, Begium, Federal Republic of Germany, Finland, Netherlands, Norway, Sweden and United Kingdom. The data have been categorised according to the large scale pattern. For eight episodes with high ozone concentrations in several countries more detailed meteorological assessments have been carried out. 16 drawings, 20 tables.

44682 **(NILU-TR—5/82) Spatial distribution of the trace element emission from conventional thermal power plants in Europe.** Pacyna, J. (Norsk Inst. for Luftforskning, Kjeller). Oct 1982. 46p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750851.

Portions are illegible in microfiche products.

The spatial distribution of the trace element emission from conventional thermal plants in Europe is estimated, using emission factors of trace metals from conventional power plants and data on net installed capacity of electricity generating plants in each country. Also data on type of fuel burned (emphazising the ash content in coal and the sulphur content in oil), data on stack dust cleaning installations and geographical position of the power plants have been used when available. 16 drawings, 10 tables.

44683 (NP—3770044) Surface ozone in the Cologne region. Brose, G.O. do Vale Pereira. (Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 16 May 1981. 89p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770044.

Portions are illegible in microfiche products; Thesis.

The author's investigations show that surface ozone concentrations are high in the cologne region, especially in periods of high atmospheric pressure. The maximum permissible mean value of 0.15 mg/m^3 for a half-hour period (i.e. about 70 ppb) is exceeded mainly in late spring and summer. This is the time of maximum insolation and also of the highest influence of stratospheric ozone on surface air. Concentrations of stratospheric ozone in surface air may amount to 40 ppb in spring and summer. In the other seasons, this value is between 20 and 30 ppb. This high surface ozone concentration is not only caused by the high intensity of solar radiation. Significant concentrations of anthropogenic ozone are formed only when the concentrations of hydrocarbons and nitric oxides are high enough. Typical photosmog situations are rare in Cologne due to the wind along the Rhine valley. The author therefore concludes that tropospheric ozone originates mostly in the stratosphere, i.e. that it is not caused by environmental pollution.

44684 (NP—3770045, pp vp) Criticism on the mass spectra of some polycyclic aromatic compounds detected in automobile exhaust gas. Herlan, A. May 1982. (In German). NTIS (US Sales Only), PC A06/MF A01.

Also published in: Zentralbl. Bacteriol., Int. J. Microbiol. Hygiene, I. Abt., Orig. Reihe B (1981) v. 173 p. 395-396.

In Institute in the year of 1981.

It was made evident that the six polycyclic aromatic compounds which had been detected in the 80 eV mass spectra of polycyclic compounds in exhaust gas condensate and subsequently enriched and isolated by Grimmer, Boehnke and Glaser are contaminated. Therefore the cancerogeneity of the isolated compounds as determined in experiments on animals cannot originate from the pure substances. To explain the deviations of the isotope ratios of the isolated substances relative to pure substances some effects which might have led to changes in the analysis have been specified.

44685 (NP—3770180) Emission cadastre Lower Austria. (Amt der Niederoesterreichischen Landesregierung, Vienna (Austria); Forschungsinstitut fuer Energie- und Umweltplanung, Vienna (Austria)). Jun 1981. 80p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770180.

Portions are illegible in microfiche products.

Emissions per year in Lower Austria (rounded figures) 70,000 t sulphur dioxide, 10,000 t nitric oxide, 140,000 t carbon monoxide, 21 t hydrofluoric acid, 16,000 t organic vapours and 8,000 t dust and aerosols. If one looks at the substance - which occupied the first place - SO_2 60% of the SO_2-emissions are accounted for by trade and industry, 20% by power and distant heating plants, 10% by households and other emitters. Discussion of details and a sketch of the Lower Austrian energy situation are provided in part II.

44686 (NP—3770181) Vehicle-emission cadastre Lower Austria. (Amt der Niederoesterreichischen Landesregierung, Vienna (Austria); Forschungsinstitut fuer Energie- und Umweltplanung, Vienna (Austria)). Oct 1982. 84p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83770181.

Portions are illegible in microfiche products.

Emissions of the main air-polluting substances (carbon monoxide, sulphur dioxide, nitric oxides, organic vapours from noncombusted hydrocarbons, lead and soot) from moving emission sources. Emission were recorded with regard to quantity but also with regard to spatial distribution and origin. The results are given as yearly emission sums and indicated in surface units of 10 x 10 km. The basis for this work was set up by means of a mathematical model and took several factors into account. Number and type of vehicle on the road distance concerned, specific emission factors, average speed and further conditions described in detail later on. Emission caused by road traffic in Lower Austria per year (rounded figures): 130 000 t carbon monoxide, 1 900 t sulphur dioxide, 24 500 t nitric oxide; 13 000 t organic vapours, 141 t lead (after deleading in 1983; about 64 t of lead) and 570 t soot.

44687 (PNL-SA—9575) Chemical and mutagenic characteristics of diesel-exhaust particles from different diesel fuels. Sklarew, D.S.; Pelroy, R.A.; Downey, S.P.; Jungers, R.H.; Lewtas, J. (Pacific Northwest Lab., Richland, WA (USA)). Oct 1981. Contract AC06-76RL01830. 8p. NTIS, PC A02/MF A01. Order Number DE83015097.

Portions are illegible in microfiche products.

A potential for increased use of a wide variety of diesel fuels has increased the importance of studies to determine whether the nitrogen content of different fuels affects the chemical and mutagenic characteristics of the particles produced during combustion. In this study, the exhaust particles from five diesel fuels with various nitrogen and aromatic hydrocarbon contents were examined. The fuels included minimum quality No. 2 (Min. Qual.), jet fuel (JP-7), shale diesel fuel-marine (DFM), a base fuel plus heavy aromatics and hexylnitrate (BF + HAN + HN), and the base fuel plus isoquinoline (BF + IQ). Particles used in the study were generated using a Mercedes 240D vehicle driven through five consecutive Highway Fuel Economy Tests.

44688 (RISO-R—463) Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air. Nielsen, O.J.; Nielsen, T.; Pagsberg, P. (Risoe National Lab., Roskilde (Denmark)). May 1982. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750844.

Hydroxyl radicals were produced by pulse radiolysis of Argon saturated with water vapor at 296 K. The kinetic features were studied by monitoring the decay of the $OH(X^2\pi \rightarrow A^2\Sigma^+)$ absorption at 3087 A. The decay observed in the reference system was simple second order with a half-life of 124 μsec. Upon addition of tetraalkyllead compound pseudo-first order kinetics with much shorter half-lives corresponding to $k(OH + \text{tetramethyllead}) = 3.8 \cdot 10^9\ M^{-1}s^{-1}$ and $k(OH + \text{tetraethyllead}) = 7.0 \cdot 10^9\ M^{-1}s^{-1}$ was observed. The lifetime of tetramethyl- and tetraethyllead in ambient air is estimated.

44689 (STU—78-7007) Ventilation in connection with vacuum impregnation. The construction of an impregnation plant with a good working environment and energy saving for the impregnation of wood. Hermansson, O.; von Gertten, E. (Styrelsen foer Teknisk Utveckling, Stockholm (Sweden)). Feb 1982. 53p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750768.

Portions are illegible in microfiche products.

Two different impregnation plants have been studied. The content of white spirit in air during impregnation, loading, unloading and storing have been recorded. The results have been used to construct a demonstration plant which is described in the report. The leakage of solvents into the air is prevented by using enclosures. The newly impregnated material is transported by cars which have special ventilation and the contact with personnel is avoided by using a chain system between the autoclave and the drying chamber.

44690 (UCID—19829) Preliminary report on the LSDM transport sub-model TRANZAM. Walton, J.J.; MacCracken, M.C.; Ellsaesser, H.W. (Lawrence Livermore National Lab., CA (USA)). Feb 1983. Contract W-7405-ENG-48. 23p. NTIS, PC A02/MF A01. Order Number DE83014933.

This is a preliminary description of a two-dimensional (zonal) advection-diffusion code to be driven by meteorological parameters generated by the Livermore Statistical Dynamic climate simulation Model (LSDM), observations, or other atmospheric simulation models. The code uses constant mass air parcels, referred to as Lagrangian Sampling Parcels (LSP), that move with the prescribed wind fields. Each parcel also contains masses of one or more trace species that are characteristic of its surroundings. In addition to being transported by the wind fields, the parcels are subject to the effects of sources, sinks, chemical transformation and diffusion. This report will first describe how the processes, excluding

chemistry, are represented in the current version of the code and then use a simplified representation of CO_2 sources and sinks for the atmosphere to evaluate model performance.

44691 **(UCRL—51444-82) Program report for FY 1982: Atmospheric and Geophysical Sciences Division of the Physics Department.** Knox, J.B.; MacCracken, M.C.; Dickerson, M.H.; Gresho, P.M.; Luther, F.M.; Orphan, R.C. (Lawrence Livermore National Lab., CA (USA)). Mar 1983. Contract W-7405-ENG-48. 77p. NTIS, PC A05/MF A01. Order Number DE83013697.

The Atmospheric and Geophysical Science Division (G-Division) summarizes herein the technical objectives and highlights of its research program for FY 1982. This research and the scientific staff participating in the program are organized into five research themes, each having commonality of interest, and shared analysis or modeling capabilities. These themes are advanced modeling, regional modeling and assessments, CO_2 and climate research, stratospheric research, and special projects. Technical summaries from each research theme are reported.

44692 **(UCRL—53423) Theoretical analysis of the past variations in global atmospheric composition and temperature structure.** Wuebbles, D.J. (Lawrence Livermore National Lab., CA (USA)). Jun 1983. Contract W-7405-ENG-48. 170p. NTIS, PC A08/MF A01. Order Number DE83015452.

Thesis.

This study attempts a comprehensive analysis of how recognized anthropogenic and natural influences may have affected the atmosphere since the beginning of the industrial age. Within this context, model results for past and present atmosphere are compared with available observations of relevant atmospheric parameters. This report also examines whether recognized anthropogenic influences are sufficient to explain recent measured trends in atmospheric ozone and temperature. An attempt is made to evaluate the chemical composition and temperature structure of the atmosphere before major human influence, termed the pre-industrial atmosphere. A comparison is made between the calculated pre-industrial and present atmospheres to determine whether the ozone and temperature distributions might have been substantially different before human activities influenced the global atmosphere. Results from this study suggest that man has altered the ozone distribution and temperature structure of the global atmosphere over this period. Increasing concentrations of CO_2, CH_4, N_2O and chlorocarbons, plus emissions of nitrogen oxides from aircraft, appear to be influencing the present atmosphere. The calculated pre-industrial (1850) atmosphere was found to be measurably different from the present atmosphere. The generally excellent comparison of observations with the calculated distribution of trace species leads confidence to the capability of current theory to represent atmospheric processes. The results presented here plus calculations studying potential anthropogenic influences on the future atmosphere suggest that total ozone measurements may not provide a very sensitive indication of the impact of human activities on the global atmosphere. Monitoring of changes in the distributions of ozone and temperature with altitude should be more useful.

44693 **(UCRL—88516) Simulations and parameter-variation studies of heavy-gas dispersion using the SLAB model.** Morgan, D.L. Jr.; Kansa, E.J.; Morris, L.K. (Lawrence Livermore National Lab., CA (USA)). Dec 1982. Contract W-7405-ENG-48. 12p. (CONF-830802—1). NTIS, PC A02/MF A01. Order Number DE83006612.

From International Union of Theoritical and Applied Mechanics symposium on atmospheric disperation of heavy gases and small particles; Delft, Netherlands (28 Aug 1983).

The SLAB model has been applied to determine the effects of varying a number of parameters on the dispersion of heavy gas in the atmosphere. In particular, one case was selected to simulate an actual spill conducted at China Lake which compared with good agreement. The results obtained for the variations are explained in terms of the relevant physical phenomena.

44694 **Application of the 2-D discrete-ordinates method to multiple scattering of laser radiation.** Zardecki, A.; Gerstl, S.A.W.; Embury, J.F. (University of California, Los Alamos National Laboratory, Theoretical Division, MS-B279, Los Alamos, New Mexico 87545). *Applied Optics;* **22**: No. 9, 1346-1353(1 May 1983).

The discrete-ordinates finite-element radiation transport code twotran is applied to describe the multiple scattering of a laser beam from a reflecting target. For a model scenario involving a 99% relative humidity rural aerosol we compute the average intensity of the scattered radiation and correction factors to the Beer-Lambert law arising from multiple scattering. As our results indicate, 2-D x-y and r-z geometry modeling can reliably describe a realistic 3-D scenario. Specific results are presented for the two visual ranges of 1.52 and 0.76 km which show that, for sufficiently high aerosol concentrations (e.g., equivalent to V = 0.76 km), the target signature in a distant detector becomes dominated by multiply scattered radiation from interactions of the laser light with the aerosol environment. The merits of the scaling group and the delta-M approximation for the transfer equation are also explored.

44695 **(LF-tr—127) Agglomeration of welding smoke: a comparison between experiments and theoretical calculation of welding-smoke agglomeration speed.** Olander, L. (Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM (USA)). 1980. Contract AC04-76EV01013. Translation source information not available . 42p. NTIS, PC A03/MF A01. Order Number DE83013964.

Portions are illegible in microfiche products.

Aerosols are often sampled on nuclepore filters in order to analyze them for size and number or for chemical analysis. Samples of welding fumes have been observed to have numbers of particle chains or agglomerates. This paper presents the results of investigations of whether welding fume particles agglomerate in the air or on the filter during sampling. (ACR)

5003 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 43394, 43878, 43880, 43881, 43936, 43964, 44691, 44718

44696 **(DOE/DP/00539—049) Community-monitoring program surrounding the Nevada Test Site: one year of experience.** Douglas, G.S. (Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.). May 1983. Contract AI08-76DP00539. 36p. (EPA—600/3-83-040). NTIS, PC A03/MF A01. Order Number DE83014799.

Since 1954, the US Public Health Service and later the US Environmental Protection Agency Laboratory in Las Vegas, Nevada, have been responsible for conducting a program of environmental radiation monitoring and public radiation safety associated with nuclear weapons tests conducted by the United States. A recent major innovation in this long-term program has been the establishment of a network of Community Monitoring Stations in 15 offsite communities. The new network supplements existing networks operated for nearly three decades in these and other offsite communities. It differs from other networks in the continuing offsite radiation monitoring and public safety program in that it incorporates Federal, State, and local Government participation. This report reviews the history of offsite radiation surveillance leading to institution of the new network and describes the first year of experience with its equipment, methodology, and management as well as its impact on citizens of the communities involved.

44697 **(DOE/EV—0005/39) Formerly utilized MED/AEC sites remedial action progam. Radiological survey of the Albany Metallurgical Research Center, United States Bureau of Mines, Biomass Facility and the Back Forty Area, Albany, Oregon.** Wynveen, R.A.; Smith, W.H.; Sholeen, C.M.; Justus, A.L.; Flynn, K.F. (Argonne National Lab., IL (USA)). Jun 1983. Contract W-31-109-ENG-38. 106p. (ANL-OHS/HP—83-101). NTIS, PC A06/MF A01. Order Number DE83015739.

This report contains survey results identifying the current radiological condition of two areas located at the site of the United States Bureau of Mines' Albany Metallurgical Research Center in Albany, Oregon. These areas are designed as the BioMass Facility and the Back Forty. The BioMass Facility was a pilot plant for the production of oil from wood waste; it consists of five structures on a two-acre site. The Back Forty is a vacant area of about 14 acres south of the BioMass Facility. Both areas were reportedly used as dump sites for the Bureau of Mines operations. No contamination was found to be associated with the structures, equipment, or material in the BioMass Facility; however, four relatively small areas of contamination were found in the exterior grounds. The maximum radiation level measured was 0.7 mR/h at 1 cm. A relatively large area (~ 0.8 acre) in the Back Forty area exhibited anomalous radiation levels. Radiation levels as high as 100 μR/h were measured at 3 ft above ground. This area was reportedly used as a dump site for Bureau of Mines activities. The structures, equipment, and material associated with the BioMass Facility can be released for unrestricted use. However, because of the subsurface contamination found in both the BioMass and the Back Forty areas, some restrictions should be incorporated into any planned useage for this site. Some discussion regarding these hazards are included in the text of this report.

44698 (INIS-mf—7605, pp 94) **Radiation burden in dwelling-houses by radon and its daughter elements.** Hofmann, W. (Salzburg Univ. (Austria). Inst. fuer Allgemeine Biologie, Biochemie und Biophysik). 1982. (In German). NTIS (US Sales Only), PC A05/MF A01. (CONF-8105201—).

From 7. annual meeting of the OeSRAD on radioactivity of building materials; Vienna, Austria (1 May 1981).

The content of ^{222}Rn and its short-lived decay products in room air shows large local as well as temporal fluctuations. The local differences are caused mainly by the concentration of ^{226}Ra in building materials and the exhalation of radon from the walls. Temporal variations result from varying ventilation conditions and changing meteorological parameters. The influence of all these factors on the natural radiation burden of man is discussed.

44699 (INIS-mf—7605, pp vp) **Radioactivity measurement of building materials.** Unfried, E. (Atominstitut der Oesterreichischen Universitaeten, Vienna:. 1982. (In German). NTIS (US Sales Only), PC A05/MF A01. (CONF-8105201—).

From 7. annual meeting of the OeSRAD on radioactivity of building materials; Vienna, Austria (1 May 1981).

Introducting the basic concept of the radioactivity measurements of building materials, those fields which can be treated with gamma-spectroscopic methods are discussed.

44700 (INIS-mf—7685, pp vp) **Plutonium aerosols size distribution in a reprocessing plant.** Perrin, M.L.; Madelaine, G. (CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Lab. de Physique de l'Atmosphere). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Concern regarding the potential release of radioactive particles in the atmosphere is actually increasing. Because of this interest, a field sampling program is in progress in the reprocessing plant of LA HAGUE to estimate the atmospheric radioactive contamination by plutonium aerosols. This paper concerns the measurement of size characteristics of plutonium aerosols generated by typical operations of the reprocessing.

44701 (INIS-mf—7685, pp vp) **Aerosols in nuclear engineering.** Schikarski, W.O. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Aerosolphysik und Filtertechnik 1). 1981. (In German). NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Nuclear aerosols represent a three-phase, dynamic system of solid particles, droplets and gaseous compounds in a carrier gas, which rapidly changes its properties due to aerosol processes external forces and geometric boundary conditions. Computer programs for description of the aerosol system have been developed showing sufficient agreement with experiments. Open questions concern the aerosol formation, form factors, certain aerosol processes as well as the aerosol chemistry. Due tothe particular properties of nuclear aerosols it is necessary to develop chemically resistant and heat-proof separators (e.g. sand bed filters).

44702 (INIS-mf—7685, pp vp) **Characterization of nuclear fuel aerosol by sedimentation.** Pickering, S. (Commission of the European Communities, Karlsruhe (Germany, F.R.). European Inst. for Transuranium Elements). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

The results obtained with the sedimentation counter showed that both the material composition and the porosity of nuclear fuel pellets were important parameters on which both the amount of aerosol and the variation of MMAD under different generating conditions depended. This work will be continued with the aim of relating these dependences to specific mechanical properties of the materials.

44703 (INIS-mf—7685, pp vp) **Studying a hot particle with radiological methods.** Maschek, I.; Csepregi, T. (National Inst. for Radiobiology and Radiohygiene, Budapest (Hungary)). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Discussion was reported on the investigation of environmental single hot particle captured onto aerosol filter. Fission nuclides identified by gamma spectrometric analysis provided the time of origin of particle, which corresponded to the date of a recent atmospheric nuclear test of 16 October, 1980. The sole presence of hot particle on the filter was registered with autoradiographs. In addition, by means of Energy Dispersive X-ray Microanalysis the particle size could be measured about micrometer. The applied methods are adequate to make a distinction on radioaerosols released by nuclear reactor and originated from an explosion.

44704 (INIS-mf—7685, pp vp) **To the resuspension of cerium-IV-oxide powder aggregates and measurement of their mass distribution.** Seehars, D.; Hochrainer, D. (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Schmallenberg (Germany, F.R.)). 1981. (In German). NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Expansion and release experiments with radioactive materials such as PuO_2-powder in order to evaluate the potential environmental exposure due to accidental release, i.e. by fire, are impossible for safety reasons. Such experiments can therefore only be performed by means of an inert model powder. This report deals with the experience gained with the model powder CeO_2. There are two reasons for choosing CeO_2: 1) This compound is of high thermal stability, it is one of those oxides that melt at high temperatures. 2) Cerium has a certain chemical reaemblance with plutonium, both metals form similar compounds with a number of elements.

44705 (INIS-mf—7685, pp vp) **Emission and ambient concentrations of longliving aerosol radionuclides at stade nuclear power plant.** Hollaender, W.; Mause, P.; Morawietz, G.; Pape, E.; Pohlmann, G. (Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Muenster (Germany, F.R.). Aussenstelle Muenster). 1981. NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

44706 **(ORNL/TM—5286) Radon dosimetry: a review of radon and radon daughter exposure conditions in dwellings and other structures.** Ryan, M.T.; Goldsmith, W.A.; Poston, J.W.; Haywood, F.F.; Witherspoon, J.P. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 48p. NTIS, PC A03/MF A01. Order Number DE83015033.

Within the past few years several situations have been brought to light which indicate an increased radiation exposure of certain segments of the general population caused by human activities. The most widely publicized activities are those associated with the mining and milling of uranium in the western United States, the phosphate industry in Florida, and those potential problems represented by former Manhattan Engineer District sites. One of the primary problems involves exposure to radon and radon daughters which are released from large waste piles or, in some cases, evolve from backfill and construction materials used in homes, schools, and other buildings. This report presents a review of the available data on radon and radon daughter concentrations in dwellings and other structures. The primary objectives were to compile and tabulate pertinent radon exposure data and to prepare a statistical summary of the data which will be useful in the prediction of normal levels of radon and radon daughter concentrations in these structures. In addition, other parameters associated with radon exposure conditions are presented and discussed.

5005 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 43880, 43881

44707 **(IDO—10057(82)) Industrial-waste-management information for 1982 and record-to-date.** Cassidy, G.B. (EG and G Idaho, Inc., Idaho Falls (USA)). Jun 1983. Contract AC07-76ID01570. 110p. NTIS MF A01. Order Number DE83015647.

Microfiche only, copy does not permit paper copy reproduction.

The industrial-waste data associated with activities at the Idaho National Engineering Laboratory (INEL) for 1982 and record-to-date are summarized. Summaries of the quantities of liquid industrial waste, the volumes of solid waste, the fuel oil and water used, and the quantities of SO_2 and particulates released are included. The waste data are from the INEL Industrial Waste Management Information System (IWMIS).

44708 **(NILU-OR—13/81) Effect of future centralized heating in Oslo on air quality. Pt. 1.** Gotaas, Y. (Norsk Inst. for Luftforskning, Kjeller). May 1981. 13p. (In Norwegian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750848.

Portions are illegible in microfiche products.

The effect of future centralized heating installations on the air quality in Oslo (Norway) is illustrated by presenting mean concentration distributions of sulphur dioxide today and in year 2000. 7 drawings.

5006 Regulations

REFER ALSO TO CITATION(S) 43993, 43994, 43996, 43997, 43998, 43999, 44004, 44655

44709 (CONF-721002—, pp 265-274) **National Air Data Branch: NEDS/SAROAD.** Hammerle, J.R. (Environmental Protection Agency, Research Triangle Park, NC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The Monitoring and Data Analysis Division is charged with the EPA functions of collection, validation, storage/retrieval, analysis, and publication of air quality data in the SAROAD system and source emissions data in the NEDS system.

51 ENVIRONMENTAL SCIENCES, TERRESTRIAL

5101 Basic Studies

REFER ALSO TO CITATION(S) 43286

44710 **(DOE/NBB—0037) Carbon in live vegetation of major world ecosystems.** Olson, J.S.; Watts, J.A.; Allison, L.J. (Oak Ridge National Lab., TN (USA)). Jun 1983. Contract W-7405-ENG-26. 191p. NTIS, PC A09/MF A01. Order Number DE83015328.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A computerized data base was developed to make a seven-color global ecology map of 44 land ecosystem mosaics or subdivisions in seven broad groups. Our main objectives are to document this compouter-based global map of vegetation and carbon density for natural and modified complexes of ecosystems and to illustrate some human influences on the global carbon cycle. The map provides a basis for making improved estimates of vegetation areas and carbon quantities, of natural biological exchanges of CO_2, and eventually of the net historic shifts of carbon between the biosphere and the atmosphere. Estimates of biomass in trees and total carbon in live plants per unit area are tabulated. The results help define the role of the terrestrial biosphere in the global carbon cycle. Results also imply major historic reductions of global carbon for broad regions and most vegetation types. Lowered estimates of carbon due to forest harvest or clearing for crops in the last century imply lowered estimates of input of nonfossil CO_2 to the atmosphere.

44711 **(DOE/NV/10162—5) Relations between soil chemistry and moisture movement.** Kautsky, M. (Nevada Univ., Reno (USA). Water Resources Center). Mar 1983. Contract AC08-81NV10162. 29p. NTIS, PC A03/MF A01. Order Number DE83015303.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Recent laboratory and field data collected in the vicinity of the Radioactive Waste Management Site (RWMS) at the Nevada Test Site (NTS) has shown that the soils contain exchangeable sodium percentages (ESP) which increase with depth below land surface. The practical significance of this is that downward movement of wetting fronts at this location may be chemically impeded if pure water, i.e., rain, is applied. Since these soil properties are completely natural, being functions of parent material, climate, and biota, no other chemical amendments to the soil would be required to maintain these favorable conditions. The hydrologic significance of high ESP values in sodic soils, i.e., lessening the infiltration, is known to exist. The degree of its influence on the soils at the RMWS and its environs is presently being investigated.

44712 **(DOE/NV/10162—9) Geological reconnaissance and chronologic studies. Technical report No. 33.** Davis, J. (Nevada Univ., Las Vegas (USA). Desert Research Inst.). Mar 1983. Contract AC08-81NV10162. 23p. NTIS, PC A02/MF A01. Order Number DE83014880.

There are several possible scenarios by which a radioactive waste storage facility in the unsaturated zone could be compromised; among them erosion, water table rise, or downward percolation of water. In order to assess these risks, the geologic and climatic events of the past few million years can be used to project the future of the unsaturated deposits. Geologic reconnaissance on and around the NTS was undertaken to identify specific evidence of depositional, erosional, and hydrologic events, as well as to develop an understanding of the timing of these events. Several kinds of evidence were noted and studied: layers or volcanic ash in the basin-fill sediments were discovered and dated at 11 to 5 m.y. old, showing the modern valleys and ranges are at least 11 m.y. old. Exposure of these ash layers by erosion has taken 5 m.y., implying that additional millions of years must pass before modern closed basins on the NTS are eroded. Detailed study of young sediments in Las Vegas Valley suggest that water tables stood at 926 m as recently as 14,000 y ago. To the northeast or the NTS, sediments in

basin bottoms also reflect high water tables until about 7000 y ago, but sediments on the NTS proper do not show this effect during the last 700,000 y. The observed relation between erosion due to downwearing or mountain ranges and infilling of valleys suggests that these processes continue, only the uppermost parts of present alluvial fans will be eroded.

44713 **(EDFB/IBP—77/5) Model for the dispersal of seeds by animals.** DeAngelis, D.L.; Stiles, E.W.; Johnson, W.C.; Sharpe, D.M.; Schreiber, R.K. (Oak Ridge National Lab., TN (USA)). Jul 1977. Contract W-7405-ENG-26. 50p. NTIS, PC A03/MF A01. Order Number DE83014893.

A mathematical model of seed dispersal by animals is presented. The computer model traces the movements of individual animals assumed to be carrying seeds from source trees. An animal takes one spatial step at a time, the direction being selected randomly but also biased by the animal's behavioral interactions with the environment. At each step there is a certain probability that the seed will be deposited or buried; this probability also depends on the characteristics of the animal and the environment. Trial simulations indicate that suitable choices of parameter values result in plausible simulations of animal movement and seed deposition for divergent disperser groups such as squirrels and birds. Although the model was developed to simulate seed dispersal in dissected landscapes composed of forest islands with intervening agricultural uses, the model should have wider applicability to problems involving animal movements under varying environmental conditions.

44714 **Competition between West Indian anoles and birds.** Waide, R.B.; Reagan, D.P. (Univ. of Puerto Rico, San Juan). *American Naturalist;* **121**: No. 1, 133-138(Jan 1983).

Wright (1981) noted an inverse correlation between anole and insectivorous bird biomass in sclerophyll scrub habitats on seven West Indian islands. Anole biomass decreased and insectivorous bird biomass increased with increasing island size. He proposed the following explanation for this pattern: Anoles and insectivorous birds compete directly for arthropod prey, and anoles experience ecological release upon the extinction of an avian competitor. Bird populations are in greater danger of extinction on small rather than large islands in the West Indies, while anole populations seldom become extinct. Hence, anoles should experience ecological release and the resulting increase in abundance more often on small islands, while avian competitors of anoles should be relatively more abundant on large islands. Wright further states that in the process of expanding population size and taking a greater proportion of available anthropod prey after the extinction of an avian competitor, anoles may inhibit recolonization by insectivorous birds on small islands in the West Indes. Here we taken exception to Wright's argument for the following reasons: (1) An alternative hypothesis, that differences in predation account for the observed pattern, is at least as likely as the extinction-mediated competition hypothesis. Wright's superficial treatment of predation ignores the substantial and well-documented impact of introduced mammals and other predators on both lizards and birds. (2) Evidence of significant dietary overlap between birds and anoles is weak, at best. (3) Patterns observed in sclerophyll scrub cannot be generalized to other island habitats.

44715 **Pronghorn responses to hunting coyotes.** Reynolds, T.D. *Great Basin Naturalist;* **43**: No. 1, 88-92([nd]).

Six accounts of pronghorn antelope (Antilocapra americana) chasing or attacking coyotes (Canis latrans) are described: three chases by individual pronghorn does, two by herds of antelope, and one joint effort by a pronghorn doe and a Short-eared Owl (Asio flammeus). Modifications of Berger's (1979) ungulate antipredatory defense model are proposed.

5102 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 43263, 43736, 43737, 44661, 44710

5103 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 43374, 43396, 43936, 44722, 45306, 45308

44716 **(EML—415) Worldwide deposition of ^{90}Sr through 1981.** Larsen, R.J. (Department of Energy, New York (USA). Environmental Measurements Lab.). Jun 1983. 87p. NTIS, PC A05/MF A01. Order Number DE83015310.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The total deposition of ^{90}Sr on the surface of the earth during 1981 was 52 kCi. The worldwide cumulative deposit decreased to about 10.3 MCi. There were 28 more kCi of ^{90}Sr deposited in 1981 than in 1980 in the Northern Hemisphere. This expected increase resulted from the 16 October 1980 Chinese nuclear detonation.

44717 **(PNL-SA—9709) Background radioactivity from natural occurrences: a preliminary review.** Wick, O.J. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 11p. NTIS, PC A02/MF A01. Order Number DE83015076.

Portions are illegible in microfiche products.

This review translates data on concentrations of uranium, thorium, and potassium in the surface and near surface into related radioactivity terms. A summary of total estimated radioactivity due to reported U, Th, and K content of four widespread geological formations, the monazite sands of Appalachia, Chattanooga Shale, Antrim Shale, and Conway Granite, is presented. (ACR)

44718 **(PNL-SA—11299) TRAN-STAT: (statistics for environmental studies), Number 23, April 1983.** Gilbert, R.O.; Simpson, J.C. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 49p. NTIS, PC A03/MF A01. Order Number DE83015094.

Various statistical computing formulas have been used to estimate the transfer of radionuclides from one environmental component to another. The parameter being estimated is the ratio μ/sub V//μ/sub U/, where μ/sub U/ is the true mean concentration of the donor component (e.g., soil), and μ/sub V/ is the true mean concentration of the receiving component (e.g., vegetation). In radionuclide research μ/sub V//μ/sub U/ may be the concentration ratio (CR) or the inventory ratio (IR). A Monte Carlo computer simulation study in conjunction with mathematical derivations of bias and root expected mean square was conducted to provide guidance on which of eight estimators (computing formulae) are most likely to give the best estimate of μ/sub V//μ/sub U/. These estimators were evaluated for both laboratory and field studies when data are normally or lognormally distributed.

44719 **Direct analysis of ^{210}Pb in sediment samples: Self-absorption corrections.** Cutshall, N.H.; Larsen, I.L.; Olsen, C.R. (Oak Ridge National Lab., TN (USA). Environmental Sciences Div.). *Nuclear Instruments and Methods in Physics Research;* **206**: No. 1/2, 309-312(15 Feb 1983).

A procedure for the direct γ-ray instrumental analysis of ^{210}Pb in sediment samples is presented. The problem of dependence of self-absorption on sample composition is solved by making a direct transmission measurement on each sample. The procedure has been verified by intercalibrations and other tests.

5104 Thermal Effluents Monitoring And Transport

44720 **(DOE/NV/10162—4) Analysis of the annual temperature wave propagating through an alluvial soil.** Panian, T.F. (Nevada Univ., Las Vegas (USA). Desert Research Inst.). Mar 1983. Contract AC08-81NV10162. 27p. NTIS, PC A03/MF A01. Order Number DE83014883.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The physical processes by which heat is transferred through a soil depend upon the mineral, organic matter, and moisture contents of the soil in addition to such physical parameters as porosity and bulk density. Heat transfer has a strong effect on matric potential in an unsaturated soil and hence on the movement of water and impurities. In dry, relatively homogeneous soils conduction is the dominant mode of heat transference. Under these conditions, the Fourier equation of heat conduction in a semi-infinite solid body having a constant thermal diffusivity can be used. A cosine wave solution of the Fourier equation is presented which describes temperature as a function of both depth and time. Annual temperature waves recorded at several depths in an alluvial soil located in Area 5 (Frenchman Flat) of the Nevada Test Site were modeled using a least squares estimate based on the cosine function. The amplitudes and phase angles of the models were found to vary with depth in the same manner as described by the solution to the Fourier equation. It was concluded that this solution described the propagation of the actual annual temperature wave and thus the thermal diffusivity of the soil could be estimated.

5105 Site Resource And Use Studies

REFER ALSO TO CITATION(S) 43220, 43242, 43378, 43387, 43389, 43397, 43961, 43962, 44707

44721 **(DOE/NV/10162—8) Economic potential of alternative land and natural resource uses at the Nevada Test Site, Nye County, Nevada.** Richard-Haggard, K. (Nevada Univ., Reno (USA). Desert Research Inst.). Mar 1983. Contract AC08-81NV10162. 83p. NTIS, PC A05/MF A01. Order Number DE83014881.

The economic potentials of several alternative land uses at the Nevada Test Site (NTS) are estimated. Alternatives considered include mining, agriculture, grazing, and hunting. There are two known tungsten ore bodies located in the Oak Spring mining district. The economic potential of the reserves is estimated to be $42,840. It is also possible that there are other economic mineral resources on the NTS whose values are yet unknown. There are an estimated 5000 ha of agricultural land on the Test Site; the cash value of alfalfa grown on this acreage is approximately $564,030. The economic potential of grazing at the Test Site lies somewhere in the range of $10,340 to $41,220. The assumed annual worth of mule deer to hunters is $90,440. The gross potential of hunting at the NTS is probably somewhat higher if trophy species, game birds and fur-bearing animals are also considered. It should be noted that the above values indicate gross worth; no costs are included in the estimates.

44722 **Cleanup trial in the plutonium valley.** Dunaway, P.B.; Sorom, E.R. (U.S. Department of Energy, Nevada Operations Office, P.O. Box 14110, Las Vegas, NV 89114). *Transactions of the American Nuclear Society;* **43**: 56-57(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

5106 Regulations

REFER ALSO TO CITATION(S) 43993, 43994, 43997, 43998, 43999, 44004

52 ENVIRONMENTAL SCIENCES, AQUATIC

5201 Basic Studies

44723 (CONF-721002—, pp 81-93) **Environmental modeling: ecosystems.** Jaworski, N.A.; Bartsch, A.F. (Environmental Protection Agency, Corvallis, OR). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

Ecosystem modeling is an essential part of water pollution research. Such modeling is still in its embryonic state for the total-ecosystem approach to environmental problems, but significant advances have been made in understanding various ecological systems through the use of models, primarily in the areas of eutrophication, the transport and effects of hazardous materials, and thermal pollution. Work must still be done to more fully describe the individual biological systems within the environment, to determine the components of the ecosystem that are germane to a specific model, and to develop solution techniques for the complex mathematical formulation relating to the various ecological processes and interactions. Major investment of time and money also remains in the verification and application of models to actual environmental situations.

44724 (CONF-721002—, pp 106-113) **Water system model development and applications within AEC and NASA laboratories.** Eliason, J.R. (Pacific Northwest Labs., Richland, WA). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

A preliminary review of water system model development in the AEC and NASA national laboratories is presented. Several of the laboratories have developed models for solving hydraulic and water quality problems as the needs for such modeling developed. These models have contributed significantly to the development of modeling techniques but no interlaboratory effort has been made to coordinate the development of unified water system models: Several types of models have been developed primarily for determining the transport of conservative and non-conservative contaminants in the environment. These include groundwater, river, lake, estuary and ocean models. Advanced models are now being developed which account for interactions and decay of contaminants in the transporting fluids as well as for accounting for interactions with suspended solids and soil materials. Application of these models should result in a better understanding of the impact that man is having on the environment.

44725 (CONF-8208123—, pp 434-446) **Role of soil in determining surface water composition.** Bache, B.W. (Macaulay Institute of Soil Research, Aberdeen, Scotland). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Incoming precipitation in rural areas passes through soil and weathering rock during passage to surface waters. The composition of the effluent is determined by its hydrologic pathway and by the material through which it flows. Reactions between water and soils or weathering rocks are normally rapid compared with typical residence times, so that the composition of water is derived from the material through which it has passed. Composition data for groundwater, drainage and surface waters illustrate these principles. Apparent deviations are explained by low residence times or unusual catchment properties, and show that detailed mineralogical and physiographic information is important for catchments in sensitive areas, if the factors controlling water composition in these areas are to be understood.

44726 **(DOE/ER/10766—T2) Mitigation of biofouling using coatings - year 3. Quarterly progress report No. 3.** Meyer, A.E. (Arvin Calspan, Buffalo, NY (USA). Applied Technology Group). 22 Jun 1983. Contract AC02-80ER10766. 12p. NTIS, PC A02/MF A01. Order Number DE83015025.

Portions are illegible in microfiche products.

A limited number of flow-cell tests was designed for the spring season in order to determine if there is any seasonal fluctuation of the fouling layers derived from the Niagara River. Chemical characteristics of the Niagara River water during the spring period are given. Significant fouling occurs in the Niagara River system within 10 days. Biofouling, reflected by the number of bacteria observed using scanning electron microscopic methods, is well-established at 10 days. Mineralization, as detected by scanning electron microscopy and energy-dispersive x-ray analysis, is in its early stages at this interval of exposure. Internal reflection infrared spectroscopy confirms the presence of a well-developed biofilm on

all surfaces and further indicates the presence of silicates on medium and high energy surfaces. The most dramatic result is the absence of bacterial on the low energy surface, even though there are large numbers of bacteria on all other surfaces tested. The low energy material represents the type of surface that has been shown to be fouling resistant in many other systems (blood, saliva, and tissue contact, etc.). Based on the limited comparison of data (Fall v spring) completed, there is little evidence of significant seasonal trends in fouling from the Niagara River.

44727 (UCRL—15534) Long-term trends in dynamic height and sea surface temperature. Barnett, T.P. (Ocean Research Consultants, La Jolla, CA (USA)). Apr 1983. Contract W-7405-ENG-48. 47p. NTIS, PC A03/MF A01. Order Number DE83014868.

Portions are illegible in microfiche products; Includes long-term trends in sea surface temperature: fact or fiction.

Secular changes in the density structure of the upper ocean are investigated to see if they can explain the apparent rise in sea level observed along the continental margins of the world's oceans. The time rate of change of dynamic height is estimated to be -0.8 dyn cm/cent, a value that is indistinguishable statistically from 0. Further, the distribution of individual values entering the grand average are distributed normally to a high degree of approximation. Assuming the change in relative sea level is real, then it could be due to either melting of the polar caps or warming of the upper ocean. Warming, since the turn of the century, of the magnitude suggested in much of the literature would have been detectable in the density structure of the upper ocean. This signal was not seen in the current analysis. A more modest warming, allowing for instrumental biases over the last 50 years and/or melting of the polar caps by just enough to give the observed change in relative sea level would have signatures in the upper ocean density field that would barely be detectable in the current study. A combination of warming and melting together should have had a signal that was marginally detectable. This latter signal was not observed. Comparison of historical sea surface temperature (SST) trends from ship-of-opportunity reports and hydrographic data suggest instrumental bias can account for roughly one-half of the apparent increase in ocean temperature since 1899. Differing measurement methods (buckets vs injection temperature) may also be partially responsible for an apparent discontinuity in the SST series in the early 1940's.

5202 Chemicals Monitoring And Transport

REFER ALSO TO CITATION(S) 43199, 43208, 43211, 43263, 43288, 43289, 43455, 43736, 44005, 44661, 44748, 44807

44728 (CONF-721002—, pp 206-211) Monitoring equipment. II. Survey of water monitoring instrumentation. Phillips, S.L. (Lawrence Berkeley Lab., CA). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

A comprehensive survey of instrumentation for water monitoring is being carried out under a grant from the National Science Foundation. Consideration is given to instruments and techniques presently in use, and to those developed for other purposes but having potential applications to water monitoring. Systems for monitoring water quality fall into three broad categories: (1) sensor-type instrumentation used for on-line monitoring, (2) on-line instruments other than sensors, and (3) laboratory instruments. Emphasis is placed on instrumentation falling in the first two categories for this discussion.

44729 (CONF-830671—1) Invasion of fossil-fuel CO_2 into the ocean. Peng, T.H. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 20p. NTIS, PC A02/MF A01. Order Number DE83014057.

From International symposium on gas transfer at water surface; Ithaca, NY, USA (13 Jun 1983).

Portions are illegible in microfiche products.

Uptake of fossil-fuel CO_2 by the ocean is calculated using one-dimensional box-diffusion-type ocean models and two-dimensional isopycnal ventilation-type models. The total uptake of CO_2 using the individual box-diffusion model calibrated for different regions of the ocean is essentially the same as that predicted by the original Oeschger global box-diffusion model. A modified box-diffusion model with deep-water formation, upwelling, nutrient cycling, and two separate vertical-mixing rates predict an uptake about 25% higher. The temperate thermocline model of the North Atlantic indicates that the two-dimensional isopycnal ventilation model may not necessarily take up more excess CO_2 than the one-dimensional vertical-mixing-type model.

44730 (CONF-8208123—, pp 161-164) Decomposition and transport of monochloramine in freshwater. Lin, Y.S.; Kim, B.R. (Georgia Institute of Technology, Atlanta, GA); Bell, T.L.; Ruane, R.J. (Tennessee Valley Authority, Chattanooga, TN). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

44731 (CONF-8208123—, pp 396-410) Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms. Waslenchuk, D.G. (Marine Sciences Institute, The University of Connecticut, Connecticut, USA). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

As utility companies refit their oil-fired power stations for use with coal, they are attracting the attention of a concerned public. The present study brought together ultra-clean sampling and handling techniques and interpretive concepts from aquatic geochemistry. Levels of metal enrichment in stream waters were revealed to be much lower (eg. Cu, 2 ug/l) than samples (eg. Cu, 20 ug/l) from previous works. Examination of the relationships between various trace metal concentrations and parameters reflecting major processes controlling metal distributions (sediment grain size, labile iron and manganese concentrations) for bottom sediments from the adjacent Connecticut River revealed that natural processes largely explained the distribution of Cd, Cr, Cu, Fe, Mn, Ni, Pb, and Zn associted with the acid leachable fraction of the sediments in all locations. While no anomalous metal concentrations were recognized amongst sediments, oligochaete worms living in the sediments beneath the cooling-water plume appeared to have accumulated more metal than those elsewhere. Because tissue metal levels were unrelated to sediment metal levels, it seems that the worms may respond more to the dissolved metal load than to the sediment burden. Tight correlations are evident between metal concentrations determined by the author's techniques and a measure of the redox poise (COD) in groundwaters near fly ash settling ponds. Relationships between parameters determined by the routine water-quality laboratories on duplicate samples, on the other hand, are characterized by the lack of correlations, suggesting that in the latter case sample handling methods were inappropriate, leading to unrepresentative concentration estimates. The correlations that appeared with the author's data, however, indicate that metal levels in the groundwater are controlled more by spatial variations in the redox poise than by pollutant (leachate) source strength.

44732 (CONF-8208123—, pp 447-458) Acid rain, catchment chracteristics and fishery status. Chester, P.F. (Central Electricity Generating Board, Central Electricity Research Laboratories, Leatherhead, UK). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

In this paper, data on lake chemistry and fishery status in the Sorlandet area of South Norway are examined for relationships between acid inputs, water composition and fishery status. The concept of the "effective reactivity" of a catchment is introduced to enable comparisons to be made between like lakes. It is found that the effective catchment reactivity is a much better predictor of fishery status than is acid input to these catchments. The factors under-

lying these relationships are discussed as is the possibility that acid deposition has changed the reactivity of these catchments in recent decades. Proposals are made for resolving some of the questions raised.

44733 (CONF-8208123—, pp 459) **Timing of acidification-induced biological changes in lakes and the relationship to predator-prey interactions.** Brakke, D.F. (Huxley College, Western Washington University, Bellingham, USA); Davis, R.B. (Department of Botany, University of Maine at Orono, Orono, USA). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

44734 (CONF-8208123—, pp 468-480) **Fishery status and water quality in areas affected by acid deposition.** Howells, G.D. (Central Electricity Research Laboratories, Leatherhead, Surrey, United Kingdom). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

While the relationships of SO_2 and NOsub(x) emissions to ambient air quality and deposition, and to surface water quality, are still matters for debate and clarification, it is generally recognised that fisheries do not thrive in acid waters. An international advisory commission (EIFAC) has reviewed much of the literature and concluded that below pH 5 progressively more severe effects on fish can be expected. Records of acid lakes in Scandinavia and America show that about 50% of lakes below pH 5 are fishless, compared with only one in seven of similar oligotrophic lakes with pH greater than 5. However, it is clear that the status of a fishery is not a simple function of the reported pH of a lake or river. Both field and laboratory studies provide evidence that other water quality factors (such as the levels of aluminium and calcium), biological factors (such as food supply, genetically determined tolerance, adaption), and ecological factors (such as lake morhphology, patterns of hydrological events) are also important. How else can we explain the continued presence of fish in some waters well below pH 5. The paper will present a review of current information from both field and laboratory investigations concerning the responses of fish and fish population to natural acid conditions in Scandinavian and North American lakes and rivers, identifying the factors which determine survival and mortality. The conclusions have some significance for remedial actions that may be proposed to alleviate acid conditions in Scandinavian and North American waters.

44735 (CONF-8208123—, pp 481-503) **Sulphur and chloride deposition and ecosystem transport in a strongly acidified lake watershed.** Hultberg, H. Grennfelt, P.; Olsson, B. (Swedish Water and Air Pollution Research Institute, Goeteborg, Sweden). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

This paper presents an attempt to synthesize deposition and ecosystem transport of sulphur and chloride through a strongly acidified lake watershed on the Swedish west coast. The results are based on field monitoring during a two-year period of concentrations in air, precipitation, streams and lakes. The water transport was monitored in three small watersheds and at the outlet of the total watershed. The dry deposition was estimated from concentration measurements and deposition velocities. Besides, throughfall was monitored in one small forested watershed. The estimated depositions into different subsystems were in good agreement with monitored outflows. The sulphur deposition to areas with coniferous forests were estimated to be 25-31 kg/ha x yr and to lake areas to about 19 kg/ha x yr. The marine part of the input is about 10%. The estimated retention of sulphur in the total watershed is 8-21%.

44736 (CONF-8208123—, pp 513-527) **Historical changes in acid precipitation and heavy metals deposition originating from fossil fuel combustion in Eastern North America as revealed by Lake Sediment geochemistry.** Quellet, M.; Jones, H.G. (Institut national de la recherche scientifique, Universite de Quebec, Canada). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

The present study deals with the geochemical stratigraphic evolution of the most recent sediments in lakes of Eastern Canada (Quebec). In particular, the sediments from two representative soft water lakes (Tantare and Laflamme) in "undisturbed" watersheds on the southern edge of the Precambrian Shield were studied. The increase in Al in the sediments of Lake Tantare since about 1950, is attributed to the processes of surface water acidification of this watershed induced by acid precipitation. The analogous upper strata of the sediments from Lake Laflamme, a non-acidified lake, show no such increase in Al content. Pb, Zn and Hg levels in the sediments increased significantly from 1940 onwards. However, the subsequent reduction in the stratigraphic concentration of Zn since 1960 in both Lake Tantare and Lake Laflamme is, in all probability, the result of the important decrease of the total particulate emissions to the atmosphere from coal-fired plants. The same phenomenon may also explain Hg decrease during the same period. In contrast, Pb shows no such reduction in the more recent strata and the sustained increase of this element in the sediments is attributed to the progression in motor vehicle activity during the past twenty years. Further data from other isolated lakes suggest that the major sources of heavy metal deposition and acid precipitation in the Province of Quebec are the emissions from fossil fuel combustion (coal and/or motor fuel) originating in the heavily industrialized American Midwest and Great-Lakes Regions.

44737 (CONF-8208123—, pp 554-562) **Model of ion equilibrium in aqueous solutions of fly ash in the context of prediction of ground and surface water contamination.** Laczny, M.J. (Environmental Pollution Abatement Center, Katowice, Poland); Krop, E.; Polak, M. (Design Office of Chemical Industry, Gliwice, Poland). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

This paper presents a model for the calculation of saturation concentration C/sub s/ of ions of poorly soluble compounds contained in waste disposed in a landfill site. Based on the laboratory studies conducted on samples taken from the entire cross section of the disposal site, compounds were selected for which a qualitative - quantitative equilibrium model was calculated using electronic computers. The algorithm and equations used in the calculations are presented. An example of the calculation is given.

44738 (CONF-8208123—, pp 565-570) **Effect of coal burning on contamination of regional resources of underground water.** Kleczkowski, A.S. (Academy of Mining and Metallurgy, Cracow, Poland); Leczny, M.J.; Marolewska, B. (Environmental Pollution Abatement Center, Katowice, Poland). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

In this paper the effects of atmospheric pollution resulting from coal burning used for satisfying the energy needs of industry and population on underground water are discussed. The examined territory covers the area of 824 km^2 and has water resources estimated at about 10 mln m^3 per year. Based on the balance of SO_4^{2-} rained out from the atmosphere, hydrological conditions of the area, and analysis of the groundwater, relationships between air quality level and degree of hydrochemical changes in the underground water, expressed as the concentration of SO_4^{2-}, were determined. Thus, the relation was proved between the level of atmospheric contamination, due to coal burning, and degradation of the underground waters.

44739 (CONF-8208123—, pp 605-614) **Water pollution arising from solid waste (coal, fly ash, slag) disposal, and measures to prevent water pollution.** Golden, D.M. (Electric Power Research Institute, Palo Alto, California, USA). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

This paper reviews the pathways that large volume utility wastes can take which can cause environmental effects. Potential interactions of the environment with land-disposed utility wastes include: effects on local air quality, efforts on soils and vegetation, phytotoxicity, groundwater effects, effects on surface waters, and disposal site washout. Both natural and engineered mitigating mechanisms are reviewed.

44740 (CONF-8208123—, pp 629-642) **Discontinuous mass chlorination of natural draft cooling towers.** Lutz, P.; Merle, G. (Electricite de France, Direction des Etudes et Recherches, Chatou, France). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Chlorination is the most currently accepted practice to control fouling in open and closed cooling systems. Continuous low-level chlorination is now widely used in marine and estuarine power plants especially to prevent mussels and shells growth. The purpose of this paper is to describe the shock chlorination process used by French power plants and to point out its efficiency for a preventive cleaning of cooling-towers. Water chemistry and environmental effects are also surveyed.

44741 (CONF-8209131—1) **Occurrence and differentiated analysis of mercury compounds in oceanic animals.** Luckas, B.; Montag, A. (Hamburg Univ. (Germany, F.R.). Lehrstuhl fuer Labensmittelchemie). 1982. 6p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83770136.

From Conference of German experts in food chemistry; Braunschweig, F.R. Germany (15 Sep 1982).

In the aquatic environment the microbial biosynthesis of organic mercury compounds - particularly of highly toxic methylmercury - may develop from inorganic mercury compounds. The mean mercury content of fishes is 200 μg/kg. However, the human health is threatened mainly by the organic mercury compounds. Consequently it is impossible to correlate the total mercury content found in oceanic animals and its toxicity without analysing the existing compounds. Therefore the authors determined the portion of inorganic and organic mercury compounds by means of parallel AAS and GC investigations. The determination method is described in detail.

44742 (DOE/ER/60000—T1) **Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface.** Takahashi, T.; Chipman, D.; Smethie, W. Jr. (Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory). 8 Jul 1983. Contract AC02-81ER60000. 15p. NTIS, PC A02/MF A01. Order Number DE83015577.

Portions are illegible in microfiche products.

The net CO_2 flux across the air-sea interface has been determined in December, 1982, in the Caribbean Sea and the tropical North Atlantic Ocean using the pCO_2 and radon-222 methods. The thermodynamic driving force for CO_2 gas transfer has been characterized in terms of the difference between the CO_2 partial pressures, pCO_2, in the surface ocean water and the overlying atmosphere, and the gas exchange coefficient (expressed in terms of the piston velocity) has been estimated on the basis of the vertical distribution of radon-222 gas in the upper 200 meters of water column. The net CO_2 flux across the air-sea interface has been computed using these two quantities. The areas north of the 10°N parallel are a CO_2 sink area, where a net CO_2 flux ranging from 0 to about 1 mole CO_2/m^2 y (from air to sea) has been observed. This compares with the global mean net CO_2 flux of about 0.6 mole CO_2/m^2 y (from air to sea). On the other hand, the areas south of 10°N are a CO_2 source area. The sea-to-air net flux of as high as 3 moles CO_2/m^2 y has been observed east of the mouth of the Amazon River. Although the equatorial surface water exhibited high pCO_2 values, the gas exchange piston velocity was small particularly in the doldrum, and hence the net CO_2 flux values ranging between 1 and 2 moles CO_2/m^2 y were observed.

44743 (KHM-TR—35) **Toxicity studies of mercury in Japan.** Kjellstroem, T. (Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE). Sep 1982. 53p. (In Swedish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83750769.

Portions are illegible in microfiche products.

The author visited government departments and individual researchers. The mercury concentration had decreased within a few years after the cessation of mercury emissions to 'normal' values for non-polluted areas. However, in Minamata Bay since 1975 an increasing mercury concentration has been found in certain fish species. Values around 1.5 μg Hg/g are now common. The mercury intakes that can be caused by consumption of fish and shellfish with the current mercury concentrations are not likely to be high enough to explain the recent cases with symptoms of poisoning. The most likely explanation of this is the earlier very high exposure in combination with a continued exposure at a lower level and ageing effects in the individual. The purpose of these studies is to find cases of 'Minamata disease', in order to approve or refuse economical compensation for a 'pollution disease'. More than 2000 cases have been found in this way, but no systematic compilations of their symptoms, latency times, prognosis, methylmercury dose, etc., have been carried out. The new Japanese data do not speak against 'late onset' symptoms being caused by methylmercury doses lower than what was believed to be a lowest effect dose. Studies of methylmercury in the umbilical cord of children born in Minamata show that there are a number of children there with mental retardation and at the same time high methylmercury in the cord. A crude dose-response analysis gives the impression that mental retardation without specific neurological symptoms (which would have given the diagnosis Minamata disease) may be caused by lower methylmercury doses than what is needed to cause Minamata disease.

44744 (LBL—16152) **CHEMTRN user's manual.** Miller, C.W. (Lawrence Berkeley Lab., CA (USA)). Mar 1983. Contract AC03-76SF00098. 155p. NTIS, PC A08/MF A01. Order Number DE83015356.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

A user's manual for operation of the chemical transport simulator CHEMTRN is presented. The manual includes descriptions of the basic equations to be solved, the solution procedure, information needed for the simulations, and the input parameters. Also included are four examples of simulations with their input and output listings, and a listing of the CHEMTRN source code with embedded comments.

44745 (SVF—121) **Reduction of organic matter in macroporous weak anion exchanger and scavenger filter. Field studies.** Persson, F. (Stiftelsen foer Vaermeteknisk Forskning, Studsvik (Sweden)). Feb 1982. 88p. (In Swedish). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750764.

Portions are illegible in microfiche products.

In project K18 reduction of organic water has been tested in four plants with macroporous weak anion exchanger. In project K19 the reduction of organic matter has been tested in five plants. The plants have macroporous weak anion exchanger and scavenger filter. The content of organic matter has been determined through $KMnO_4$-consumption, absorption with UV and filtering index. $KMnO_4$-consumption and absorption with UV are in good agreement. Filtering index has results without any connection to the content of organic matter. Macroporous weak anion exchanger has a very good reduction of organic matter. After $KMnO_4$-consumption the reduction is in general 60-80%. The resin has at maximum picked up 11 g $KMnO_4$/l. Breakthrough of organic matter and increasing of conductivity in all plants with macroporous weak anion has been at the same time. For supervision in this type of plants, measurement of only conductivity is sufficient. Project K19 has ahown that raw water with low content with organic matter can be

demineralizated without flocculation. The following conclusions can be drawn: 1) When the organic matter in the water to a plant is high, >25 ppm $KMnO_4$, installation of scavenger filter can be considered. 2) The capacity for chloride and sulphate of the macroporous weak anion exchanger decreases much when the content of organic matter is high. 3) Exhaustion flow rate affects the reduction of organic matter very little. 4) When the $KMnO_4$-consumption is over 25 ppm flocculation normally ought to be installed. 5) The investigations show very clearly that when make-up water with high demands is required flocculation is necessary. In the boiler the particles are decomposed and give in the steam acid products and corrosion.

44746 **(RFP-Trans—406) Method for treating solid substances in original water.** Ichikawa, S. (Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant). Jul 1983. Contract AC04-76DP03533. Translation of Japanese Patent 1980-61979. 5p. NTIS, PC A02/MF A01. Order Number DE83015032.

Portions are illegible in microfiche products.

A method for treating solid substances in original water, related to a process comprising the addition of magnetite and coagulants to original water to coagulate the solid substance and magnetite together in the original water, the use of a magnetic separator to separate the original water containing the coagulated substance into water and the coagulated substance, and the separation of the solid substance from the coagulated substance, characterized by a step that follows the separation of original water into water and the coagulated substance - not the separation of the magnetite from the coagulated substance, but a step of heating the coagulated substance to gasify and discharge the moisture and organic substances contained therein, followed by the separation of the magnetite and the removal of the solid substance.

5203 Radioactive Materials Monitoring And Transport

REFER ALSO TO CITATION(S) 43221, 43366, 43393, 43394, 43396, 43399, 44697, 44718

44747 **(INIS-mf—7680) Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors.** Feldt, W.; Kellermann, H.J.; Kanisch, G.; Lauer, R.; Melzer, M.; Nagel, G.; Brinkmeier, G. (Bundesforschungsanstalt fuer Fischerei, Hamburg (Germany, F.R.). Isotopenlaboratorium). Mar 1981. 157p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83780886.

The Elbe river is pre-loaded mostly by strontium-90 and cesium-137. Experiments carried out in aquaria by means of radiotracers showed that cesium-137 in equilibrium is enriched by a factor 36 in North Sea shrimps. Using the calculated radioecological parameters the radiation exposure via the environmental exposure pathways drinking water-ingestion of fish, milk, meat swimming boating, and the stay at the river banks have been calculated. For the transfer of phosphorus 32 via the food chain Tubiflex-shrimps-flounders, for example, a transfer-factor of 0.11 was found. (DG).

44748 **(PNL—4659) Ground-water surveillance at the Hanford Site for CY 1982.** Eddy, P.A.; Prater, L.S.; Rieger, J.T. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76RL01830. 92p. NTIS, PC A05/MF A01. Order Number DE83014885.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Operations at the Hanford Site since 1944 have resulted in the discharge of large volumes of process cooling water and other waste waters to the ground. These effluents, which have reached the unconfined ground water, contain low levels of radioactive and chemical substances. The movement of these constituents in the unconfined ground water is monitored as part of the Ground-Water Surveillance Program. During 1982, 324 monitoring wells were sampled at various times for radioactive and chemical constituents. Tritium are the primary ones used to monitor the movement of the ground water. This report describes recent changes in the configuration of the tritium and nitrate plumes. The tritium plume continues to show increasing concentrations near the Columbia River. While it is mapped as having reached the Columbia River, its contribution to the river has not been distinguished from other sources at this time. The general plume configuration is much the same as in 1978, 1979, 1980, and 1981. The size of the nitrate plume appears stable. Concentrations of nitrate in the vicinity of the 100-H Area continue to be high as a result of past leaks from an evaporation facility.

44749 **Ultimate removal mechanisms of elements from the ocean.** Li, Y.H. (Columbia Univ., Palisades, NY). *Geochimica et Cosmochimica Acta;* **46**: 1993-1995(1982).

The surface complex formation model provides a consistent mechanistic explanation to the observed partitioning of elements between solid and liquid phases in the ocean, while the Q/sub MO/ parameter with the present form provides no insight with regard to the mechanisms of adsorption of dissolved elements onto particles in the ocean. The results from laboratory determination of distribution coefficients in seawater-sediments systems for large numbers of radioactive cations and anions hopefully will solve our argument.

5204 Thermal Effluents Monitoring And Transport

44750 (CONF-8208123—, pp 589-604) **Water quality and the discharge of cooling water into rivers, lakes and coastal waters.** Gasparini, R. 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

This paper resumes some of the main findings and conclusions of a study group on cooling water problems set up by UNIPEDE. The basic aim of the work was the study of the effects of the discharge of cooling water in the receiving water bodies (rivers, lakes and coastal waters). The paper deals with the problem of damage to organisms entering a cooling system. An important factor in assessing the meaning of such aspects is the growing evidence that there is no reduction in fish population of the receiving water body associated with the operation of modern power plants despite the catch in the once through-cooling systems due to entrainment and impingement, that can be minimized, but not avoided. Different methods of fouling prevention in power plants, with their possible environmental effects in the receiving water bodies are discussed. A comprehensive review is given of the results of aquatic impact studies at power plants, that is the results of many experimental investigations carried out in the field to evaluate the effects of the operation of once through cooling systems sited on rivers, lakes, or coastal waters.

44751 **(SFB—80/E/200) Measurement of jet propagation in the intermediate near-field of a coolant water outlet.** Grimm-Strele, J. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Sonderforschungsbereich Ausbreitungs- und Transportvorgaenge in Stroemungen). Aug 1981. 32p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83751081.

Portions are illegible in microfiche products.

The Rhine area around the coolant water outlet of Karlsruhe Rhine Steam Power Plant has been chosen as measuring point. An inductive velocimeter has been used for determination of the velocity components. The isothermal lines show a rapid setting ashore of the floating beam.

5206 Regulations

REFER ALSO TO CITATION(S) 43993, 43994, 43997, 43998, 43999, 44004

44752 (CONF-721002—, pp 94-105) **Environmental modeling of hydrologic systems.** Fitch, W.N. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

This paper traces the genesis of mathematical modeling of hydrologic and water quality systems as used in EPA. Legislation

required studies amenable to modeling and systems analysis techniques. Models of dissolved oxygen and of reservoir storage requirements were common. Estuary modeling developed with the Delaware River analysis. Three hydrologic models are described relative to streamflow generation techniques giving the underlying theory. Other hydrologic models described are those for real time flood, real time stormwater routing, snow surveys, flow routing in a stream network with reservoirs, Monte Carlo analysis, and reservoir operation optimization. Water quality models described are those for dissolved oxygen in free-flowing streams, tidal rivers, and estuaries. Currently EPA is stimulating and supporting the application of mathematical models by State and local organizations planning for water quality management in specific basins.

44753 (CONF-721002—, pp 251-264) **National water quality control information system (STORET).** Wirth, G.F.; Wastler, L.C. (Environmental Protection Agency, Washington, DC). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

The National Water Quality Control Information System (STORET) provides the ability to relate hierarchically structured data files to the possible alternatives and outcomes in water quality control decision-making. The system is designed to provide information for both administrative and technical decisions. STORET presently contains 10 individual files which relate primarily to identification of wastewater discharges and ambient water quality. Use of the system is provided through remote computer terminals to 10 EPA regions, 8 other Federal agencies, and 30 States for purposes of common data usage and prevention of duplication of data-gathering effort. Improvements being added to STORET include a River Mile Index (RMI) location system which will allow hydrologic order location of points of interest and a General Point Source File (GPSF) which will accept descriptions of all point sources of pollution.

53 ENVIRONMENTAL-SOCIAL ASPECTS OF ENERGY TECHNOLOGIES

5301 Social And Economic Studies

REFER ALSO TO CITATION(S) 43514, 44119, 44696

44754 **(NP—3770008) Road and environment.** Angerer, F.; Hiersche, E.U.; Martin, E.; Olschowy, G.; Schaechterle, K. (Forschungsgesellskchaft fuer das Strassenwesen e.V., Koeln (Germany, F.R.)). Oct 1980. 131p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83770008.

Portions are illegible in microfiche products.

First of all the present report demonstrates the reasons, the extent and the consequences of the future distribution of traffic. Only then can suggestions be made on how the traffic system "road" can be integrated into the natural and urban environment. Such solutions shall help to reduce the contrast between road and environment which occurs mainly in high-load residential and industrial areas. The interdisciplinary team of authors consisted of: a traffic planner, road planner, road constructor, city planner and constructor, landscape conservator, and an ecologist.

5302 Assessment Of Energy Technologies

REFER ALSO TO CITATION(S) 43432, 43454, 44007

44755 **(EPA—450/3-83-011a) Inorganic-arsenic emissions from glass-manufacturing plants: background information for proposed standards.** (Environmental Protection Agency, Research Triangle Park, NC (USA). Office of Air Quality Planning and Standards). Apr 1983. 187p. NTIS.

A national emission standard for glass manufacturing plants is being proposed under authority of Section 112 of the Clean Air Act. The purpose of the proposed standard is to minimize glass manufacturing furnace arsenic emissions to the level which, in the judgment of the Administrator of the US Environmental Protection Agency, provides an ample margin of safety to protect the public health. The standard will have the effect of reducing uncontrolled emissions of arsenic from these furnaces by about 90 percent. Environmental impact and economic impact statements quantifying the impacts of the proposed standard and alternative control options are included in the document.

5303 Environmental Impact Statements

REFER ALSO TO CITATION(S) 43288, 43289

44756 **(NUREG—0904-FINAL) Final Environmental Statement related to the decommissioning of the Rare Earths Facility, West Chicago, Illinois. Docket No. 40-2061.** (Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Material Safety and Safeguards). May 1983. 523p. NTIS, PC A22/MF A01 - GPO $10.00. Order Number DE83902259.

Portions are illegible in microfiche products.

This Final Environmental Statement is issued by the US Nuclear Regulatory Commission in response to the plan proposed by Kerr-McGee Chemical Corporation for the decommissioning of their Rare Earths Facility located in West Chicago, Illinois. The statement considers the Kerr-McGee preferred plan and various alternatives to that plan. The action proposed by the Commission is the renewal of the Kerr-McGee license to allow stabilization of wastes onsite and for possession of the wastes under license for an indeterminate time. The license could be terminated at a later date if certain specified requirements were met.

55 BIOMEDICAL SCIENCES, BASIC STUDIES

5501 Behavioral Biology

REFER ALSO TO CITATION(S) 44713, 44715

5502 Biochemistry

44757 **(CEA-CONF—6573) Chloride permeability of large unilamellar lipidic vesicles.** Louni, L.; Rigaud, J.L.; Gary-Bobo, C.M. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Oct 1982. 9p. (CONF-8209143—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750927.

From 36. international meeting of French Physical Chemistry Society; Paris, France (27 Sep 1982).

Portions are illegible in microfiche products.

Liposomes have been prepared by a combination of reverse phase evaporation and extrusion through nucleopore membranes. The vesicle preparations are homogeneous in size and the mean vesicle diameter is about 0.15 m. Such large liposomes are shown to be impermeable to many ionic species such Na^+, K^+, SO^{2-}, PO_4^{2-}. On another hand liposomes are permeable to H^+ and Cl^-. Studies of proton movements, using pH meter and ^{31}p NMR techniques, in the presence or absence of Cl^- allow to analyse the different mechanisms proposed for chroride diffusion

44758 **(DOE/EV/03221—80) Analogous mechanisms of biological damage induced by ascorbate and superoxide in the presence of copper. Progress report, July 1982-June 1983.** Shinar, E.; Navok, T.; Chevion, M. (Hebrew Univ., Jerusalem (Israel)). 1983. Contract AC02-76EV03221. 28p. NTIS, PC A03/MF A01. Order Number DE83014719.

The mechanism of enzymatic inactivation of purified and membrane-bound acetylcholine esterase (AChE) by ascorbate and copper was investigated. While the exposure of the enzyme to either ascorbate or copper did not cause enzymatic inactivation, the incubation of the enzyme with a combination of both ascorbate and copper resulted in a loss of AChE activity, which was time dependent. The presence of molecular oxygen or hydrogen peroxide was indispensable for the enzymatic inactivation. Scavengers of hy-

droxyl radicals at concentrations of up to 100mM did not provide protection to AChE. Only mannitol at very high concentrations (above 1M) efficiently prevented the inactivation of the enzyme. The kinetics of the aerobic oxidation of reduced ascorbate in the presence of AChE and copper closely followed the rate of enzyme inactivation. Addition of the chelating agents, EDTA and diethylentriaminepentaacetic acid, prevented both the oxidation of ascorbate and the inactivation of the enzyme. In the presence of low concentrations of histidine (0.5 to 2.0mM), which forms high affinity complexes with copper, the rate of ascorbate oxidation was similar to that recorded in its absence. On the other hand, no enzyme inactivation was indicated in the presence of histidine. Low temperature EPR measurements have demonstrated the binding of copper to the enzyme, and have shown the reduction of the cupric-enzyme to the corresponding cuprous complex.

44759 **(PNL-SA—9916) Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review.** Ragan, H.A. (Pacific Northwest Lab., Richland, WA (USA)). Oct 1981. Contract AC06-76RL01830. 17p. (CONF-811035—8). NTIS, PC A02/MF A01. Order Number DE83014097.

From 21. Hanford life sciences symposium on biological availability of trace metals; Richland, WA, USA (4 Oct 1981).

Numerous factors may act to increase or decrease the biologic availability of heavy metals. The precise mechanisms controlling gastrointestinal absorption are unknown, even for an essential element as extensively studied as iron. For iron there is substantial evidence that absorption is controlled at the level of the intestinal mucosal cell either involving receptors on the brush border or cytosal factors. Probably multiple controls are operative. In any case, the condition of body-iron stores exerts a strong influence on iron absorption. With lead and cadmium absorption is not influenced by the body burden, but the status of body-iron stores does determine to some extent the amount of lead or cadmium which may be absorbed.

5503 Cytology

REFER ALSO TO CITATION(S) 44801

5505 Metabolism

REFER ALSO TO CITATION(S) 44366, 44761, 44762, 44764

5506 Medicine

REFER ALSO TO CITATION(S) 44324, 44363, 45062

44760 **(BMFT-FB-T—83-039) Effectiveness of testis cancer screening.** Feucht, H. (Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)). Apr 1983. 175p. (In German). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83750923.

In the Federal Republic of Germany there are about thousand to two-thousand incidences of testis cancer yearly. The screening (and examination) program currently used for the early detection of cancer includes the screening of malignant tumours of the testis. Since only males 45 years and older are invited to make use of the preventive measures, the most seriously affected age-group between twenty and forty is hereby not considered. The objective of this study is to find out which of the generally conceivable preventive measures could lead to an improvement of the present situation. The analysis shows that, for a diagnostic accuracy of 1 and a participation of 100%, the quantifyable cost of a yearly performed special screening is higher than the quantifyable cost savings achieved. A final judgement of other ways of execution is only possible when the diagnostic accuracy of suitable screening methods and the percentage of the participants of the groups of people concerned are known.

44761 **(CEA-CONF—6456) Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine.** Bustany, P.; Soussaline, F.; Comar, D.; Henry, J.F. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 17p. (CONF-8209118—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702076.

From Meeting on radionuclides and brain disease; Crans-sur-Sierre, Switzerland (7 Sep 1982).

A compartmental model representing protein synthesis in the brain was validated experimentally in 9 baboons. After sequential injections of ^{11}C, ^{3}H and ^{14}C methionines on the same animal, followed by P.E.T. recording of the γ activity in a chosen brain section with time, the distribution of methionine injected into the different compartments of the model after a bolus was measured by crushing and precipitation with T.C.A. The agreement between direct in vitro findings and computed results is excellent. This method of studying brain protein synthesis in vivo was applied to 28 Alzheimer dementia cases and 20 normal subjects of the same age. The correlation between the results of clinical and psychometric tests and the brain protein synthesis activity confirms an anomaly in this biochemical synthesis process during the illness. A 65% fall in activity may be found in the frontal lobes of certain patients.

44762 **(CEA-CONF—6457) Local cerebral blood flow (lCBF) and oxygen consumption (lCMRO$_2$) in evolving irreversible ischemic infarction: a study with positron tomography and oxygen-15.** Baron, J.C.; Rougemont, D.; Lebrun-Grandie, P.; Comar, D.; Bousser, M.G.; Bories, J.; Castaigne, P.; Cabanis, E. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 12p. (CONF-8209118—2). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702077.

From Meeting on radionuclides and brain disease; Crans-sur-Sierre, Switzerland (7 Sep 1982).

In 25 patients suffering from cerebral ischemia set up in the area of the internal carotid artery the local cerebral blood flow (lCBF) and local cerebral oxygen consumption (lCMRO$_2$) were measured by the method of continuous inhalation of oxygen 15-labelled gas combined with positron emission tomography. These two local parameters and their ratio, the local oxygen extraction rate (lO$_2$E), were studied inside the brain region tending spontaneously towards ischemic necrosis, a zone defined by means of repeated tomodensitometric examinations. The essential facts observed are the variability of the lCBF and the lO$_2$E values, from extremely low to extremely high, whereas the collapse of the lCMRO$_2$ is constant. Consequently this last parameter alone would be a good prognostic index, an lCMRO$_2$ decrease to a level below about 70% of the controlateral value indicating that the necrosis is spontaneously irreparable. These results are discussed in the light of published data.

44763 **(CEA-CONF—6458) In vivo study of the dopaminergic receptors in the brain of man using ^{11}C-pimozide and positron emission tomography.** Baron, J.C.; Comar, D.; Crouzel, C.; Mestelan, G.; Zarifian, E.; Loo, H.; Agid, Y. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 13p. (CONF-8209118—3). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702078.

From Meeting on radionuclides and brain disease; Crans-sur-Sierre, Switzerland (7 Sep 1982).

Positron emission tomography was used to establish the regional cerebral pharmacokinetics of a carbon 11-labelled neuroleptic, pimozide, in an attempt to observe its specific bonding to dopaminergic receptors in vivo. The ^{11}C-pimozide kinetics were compared in two brain structures at the two ends of the dopaminergic receptor density scale: the striatum and cerebellum, very rich in and devoid of these receptors respectively. In 8 patients a significant radioactivity uptake was observed in the striatum as compared with the cerebellum, in agreement with in vivo studies on animals using tritiated pimozide. In 5 patients pre-treated by a therapeutic dose of a cold neuroleptic (haloperidol) this difference in kinetics no longer existed. Moreover no kinetic difference is observed, either before or after haloperidol administration, between the frontal cortex (relatively low in dopaminergic receptors) and cerebel-

lum. These results strongly suggest that pharmacokinetic phenomena directly related to the specific bonding of ^{11}C-pimozide on the striatal dopaminergic receptors are observable on man in vivo. This specific bonding however remains quantitatively weak as compared with the strong non-specific bonding.

44764 **(CEA-CONF—6474) Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man.** Baron, J.C.; Rougemont, D.; Lebrun-Grandie, P.; Bousser, M.G.; Cabanis, E.; Bories, J.; Comar, D.; Castaigne, P. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 6p. (CONF-8209118—4). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702079.

From Meeting on radionuclides and brain disease; Crans-sur-Sierre, Switzerland (7 Sep 1982).

Positron emission tomography (PET) allows in vivo measurement of local cerebral blood flow (1CBF), oxygen consumption rate (1CMRO$_2$) and glucose utilisation (1CMRG1c) in man. Although 1CMRG1c is accessible in animals, this is not the case for 1CMRO$_2$, an excellent index of local functional state. PET imaging of the local interrelationship of CBF and metabolism in completed ischemic stroke has attracted considerable interest because of its potential to differentiate irreversibly damaged from viable tissue on the basis of the CBF- metabolism patterns. Several qualitative or semi-quantitative pioneering studies provided a limited insight into this question, while the single truly quantitative study was only briefly reported. We report here a detailed study of the local CBF-CMRO$_2$ quantitative patterns in irreversibly infarcted brain regions.

44765 **(CEA-CONF—6484) Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine.** Baron, J.C.; Lebrun-Grandie, P.; Serdaru, M.; Bousser, M.G.; Lhermitte, F.; Cabanis, E. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). Sep 1982. 14p. (In French). (CONF-8205175—1). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702080.

From Joint meeting on migraine and cerebral ischemia; Marseille, France (15 May 1982).

This work gives the results of a study by positron emission tomography of the cerebral blood flow (CBF), oxygen-extraction rate (O_2E) and oxygen consumption (CMRO$_2$) during severe and prolonged attack of hemiplegic migraine. The salient facts observed are a high (CBF) in the brain hemisphere affected (ruling out the hypothesis of a persistent cerebral ischemia), together with a collapsed O_2E ("luxury perfusion") and especially preservation of the CMRO$_2$ suggesting a decoupling not only between CBF and CMRO$_2$ but also between CMRO$_2$ and functional state of the tissue. Some time after the attack a new study showed the recoupling between CBF and CMRO$_2$, but with the latter reduced in the affected hemisphere although the clinical and tomodensitometric state had returned to normal. These new observations should not however be improperly generalised to all migraines, given the unusual characteristics of the disorder in our patient.

44766 **(DOE/ER/60029—2) Portable fluxgate magnetometer for non-invasive measurement of occupationally acquired lung dust. Progress report, September 15, 1982-September 14, 1983.** Freedman, A.P.; Robinson, S.E. (Hahnemann Medical Coll. and Hospital, Philadelphia, PA (USA)). May 1983. Contract AC02-81ER60029. 23p. NTIS, PC A02/MF A01. Order Number DE83014827.

Portions are illegible in microfiche products.

The construction and testing of a prototype of a portable low-noise fluxgate magnetometer is nearly complete. The instrument being developed will be useful for the non-invasive measurement of the pulmonary burden of coal mine dust and coal fly ash by magnetopneuomography. The fluxgate sensor noise, critical to its application in making lung dust measurements, was measured using a spectrum analyzer. Intrinsic sensor noise ranged from 10.1 pT rms per root Hz (dc to 10Hz bandwidth). The sensor cores are currently undergoing a hydrogen re-annealing process to further reduce their noise. It is expected that re-annealing will yield some sensors with as low as 6 pT rms per root Hz intrinsic noise. The technology chosen for developing a portable instrument for magnetopneumography has been proven. Although the fluxgate magnetometer is noisier than the less portable SQUID (superconducting) magnetometer, its noise is well below the values seen in our measurements of coal mine dust samples for DOE in 1981-1982 and our ongoing studies of coal workers. Therefore, the sensors tested should be adequate to perform on-site measurement of occupational lung burdens of coal mine dust and coal fly ash. Ultimately, this instrument must be evaluated in a field test using human subjects (coal workers) and the results compared with those obtained with a SQUID magnetometer.

44767 **(DOE/EV/04625—T3) Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983.** Hoffer, P.B. (Yale Univ., New Haven, CT (USA)). 1 Jun 1983. Contract AC02-78EV04625. 35p. NTIS, PC A03/MF A01. Order Number DE83014765.

The gamma camera-computer interface was modified to allow the computer to accept both a spatial and energy address from each incoming photon. We have used this system to study the effect of scatter on measurement of ventricular function by ejection fraction (EF). Our preliminary results indicate that energy windowing, which decreases scatter fraction, increases recorded ejection fraction, EF. These results indicate that energy resolution and windowing must be considered when normal EF values are established, patients are studied on different instruments, or old equipment is replaced with newer model cameras. We have also further elucidated possible mechanisms by which Gallium-67 localizes in inflammatory lesions and tumors. Gallium-67 can transfer from transferrin and lactoferrin to ferritin. Transfer can be influenced by a number of mediators. We have studied the localization of Gallium-67 in a benign non-infected bone lesion (fracture). Although Gallium-67 uptake in such lesions appears on imaging to be less than /sup 99m/Tc-MDP uptake, the actual quantitative uptake in bone is identical. We are currently conducting studies of Gallium-67 uptake in an osteomyelitis model in rabbits in order to determine if such uptake accurately reflects the effect of antibiotic treatment.

44768 **(IAEA-RL—92(Rev.82)) Treatment of cancer of the uterus in developing countries: Proposals for a programme.** Taylor, C.B.G. (International Atomic Energy Agency, Seibersdorf (Austria). Laboratories). Nov 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702085.

Cancer of the uterus is one of the most common forms of cancer in developing countries. It may be successfully treated or favourably influenced by intracavitary treatment. For this therapy there are commercially available systems. Three levels of complexity (according to the equipment of the hospital) are recommended for the application of this procedure in the developing countries and the procedure for its introduction is suggested.

44769 **(INIS-mf—7672) Indium-111 labelled leucocyte scintigraphy in the diagnosis of inflammatory disease. A clinical study.** Roevekamp, M.H. (Amsterdam Univ. (Netherlands)). 24 Jun 1982. 114p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780892.

Thesis.

The purpose of this study was to evaluate the diagnostic usefulness of indium-111 oxinate labelled autologous leucocytes in inflammatory disease. Chapter I provides an outline of the theoretical aspects of leucocyte labelling with indium-111 oxinate, as well as giving a description of the labelling method and scintigraphic technique and of the in-vitro and in-vivo studies performed to evaluate the method. In Chapter II details are given of the initial results obtained in a pilot study. A high false-negative rate led to modification of the labelling technique. The results obtained in patients suspected of intra-abdominal or retroperitoneal located inflammatory lesions are described in Chapter III. Chapter IV contains the description of an indium-111-leucocyte-99mTc-Sn-colloid computer-assisted subtraction technique for a better evaluation of patients suspected of an upper-abdominal inflammatory process. In Chapter V the study performed in patients after arterial reconstructive surgery is described, and the results obtained in patients suspected of an infected orthopaedic prosthesis are given in Chapter VI. Finally the

characteristics of the different types of inflammatory responses is reviewed.

44770 **(INIS-mf—7674) Some radiopharmaceuticals derived from carbon-eleven labelled phosgene. Synthesis and clinical application.** Roeda, D. (Vrije Univ., Amsterdam (Netherlands)). 19 Feb 1982. 116p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780893.

Thesis.

This thesis deals with some applications of the short lived cyclotron produced radioisotope carbon-11 (half life 20.4 min.) For medical use. Both chemical manipulation of highly radioactive gamma emitting material in order to prepare suitable ^{11}C-labelled radiopharmaceuticals and two clinical studies are discussed. The first chapter comprises a general introduction concerning the application of the "tracer principle" to the short lived positron emitting radionuclides ^{18}F, ^{11}C, ^{13}N and ^{15}O in medicine. Chapter two deals with the synthesis of $^{11}COCl_2$. This product is a useful new ^{11}C-synthon with many potential applications. In chapter three the synthesis of ^{11}C-urea from ^{11}C-phosgene for medical use is described. The method uses the reaction of $^{11}COCl_2$ with aqueous ammonia. Chapter four deals with the synthesis of ^{11}C-barbituric acids and ^{11}C-hydantoins and presents a clinical study on epilepsy, using 2-^{11}C-5,5-diphenylhydantoin (^{11}C-DPH). Patients having intractable epilepsy and patients having no epilepsy were given intravenously a single dose of ^{11}C-DPH after which the accumulation of the radioactivity in the brain was followed by positron emission tomography. No regional concentration differences could be found near epileptic foci. There was a faint indication that there are some differences in uptake for whole brain between the two categories of patients.

44771 (INIS-mf—7685, pp vp) **Application of radioactive aerosols in diagnostic techniques of bronchial obstructions in the clinical practice.** Koehler, D.; Daikeler, G.; Schuemichen, C.; Siebold, A.; Matthys, H. (Freiburg Univ. (Germany, F.R.). Abt. Pulmologie; Freiburg Univ. (Germany, F.R.). Zentrum Radiologie). 1981. (In German). NTIS (US Sales Only), PC A15/MF A01. (CONF-8109188—Vol.2).

From Conference on aerosols in science and technology - aerosols in and from in and from industrial processes; Duisburg, F.R. Germany (23 Sep 1981).

Description of a technique for early diagnosis of chronical bronchitis, that is based on analyzing of deposition patterns obtained by inhalation of radioactive aerosoles. To this effect a new atomizer has been developed that permits to draw quantitative indications from inhalation scintiscanning. (RW).

44772 **(INIS-mf—7983) Right and left ventricular ejection fraction at rest and during exercise assessed with radionuclide angiocardiography.** Dahlstroem, J.A. (Lund Univ. (Sweden)). 19 May 1982. 119p. (In Swedish). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780880.

Right (RVEF) and left ventricular ejection fraction (LVEF) assessed with radionuclide angiocardiography were compared to simultaneously obtained catheterization results at rest and during exercise in patients with pulmonary hypertension and ischemic heart disease. Blood pool imaging was performed with red blood cells (RBC) labelled with ^{99}Tcsup (m) in vivo as this method gave more stable ^{99}Tcsup (m) levels in blood compared to ^{99}Tcsuo (m)-labelled human serum albumin and because it was more convenient than labelling RBC in vitro. RVEF measured with first pass (FP) technique and equilibrium (EQ) technique correlated well at rest, r=0.86, and during exercise, r=0.91. The FP technique had the best reproducibility and reference values at rest were 49+-5 per cent increasing with exercise. When ^{99}Tcsup (m) and ^{133}Xe were compared to assess RVEF with FP technique, the correlation was good, r=0.88. LVEF assessed with EQ technique and a fixed end-diastolic region of interest was very reproducible at rest and during exercise; reference values at rest were 56+-8 per cent increasing with exercise. In 10 patients with pulmonary hypertension significant negative correlations were found between RVEF assessed with FP technique and pressures in pulmonary artery and right atrium. Abnormal RVEF was found in all patients with right ventricular disfunction. In 22 patients with recent myocardial infarction measurements of LVEF detected left ventricular dysfunction better than did measurement of pulmonary artery diastolic pressure. During effort angina in another 10 patients all had abnormal LVEF and abnormal hemodynamics. By combining ejection fraction and stroke volume, ventricular volumes were calculated at rest and during exercise. (Author).

44773 **(INP—1089/B) Radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx.** Skolyszewski, J. (Institute of Nuclear Physics, Krakow (Poland)). 1980. 54p. (In Polish). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83702082.

The aim of this work is to present the principles of radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx, according to the experience of the Institute of Oncology in Krakow. The text was designed primarily for the radiotherapists involved in the treatment of those neoplasms, and may be used as an auxiliary textbook for those preparing for the examination in radiotherapy.

44774 **(INP—1090/B) Radiation therapy of tumours of the central nervous system.** Skolyszewski, J. (Institute of Nuclear Physics, Krakow (Poland)). 1980. 34p. (In Polish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702083.

The aim of this work is to present the principles of radiation therapy of tumours of the central nervous system, according to the experience of the Institute of Oncology in Krakow. The text was designed primarily for the radiotherapists involved in the treatment of tumours of the central nervous system, and may be used as an auxiliary textbook for those preparing for the examination in radiotherapy.

44775 **(INP—1091/B) Radiation therapy of cancer of the lung.** Kujawska, J. (Institute of Nuclear Physics, Krakow (Poland)). 1980. 18p. (In Polish). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702084.

The aim of this work is to present the principles of radiation therapy of cancer of the lung, according to the experience of the Institute of Oncology in Krakow. The text was designed primarily for the radiotherapists involved in the treatment of cancer of the lung, and may be used as an auxiliary textbook for those preparing for the examination in radiotherapy.

44776 **(PNL-SA—9668) Neutron-activation analysis in vivo.** Palmer, H.E. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 7p. NTIS, PC A02/MF A01. Order Number DE83015089.

The use of neutron activation analysis for the determination of the elemental composition of a living person is briefly described. Applications and procedures are discussed. (ACR)

44777 **(RL—82-036) In vivo imaging of the human thyroid with the Rutherford positron camera using ^{124}I.** Bateman, J.E.; Flesher, A.C.; Connolly, J.F.; Stephenson, R.; Fairweather, D.S.; Bradwell, A.R.; Wilkinson, R. (Science Research Council, Chilton (UK). Rutherford and Appleton Labs.). May 1982. 38p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702081.

The Rutherford Multiwire Proportional Counter (MWPC) positron camera has been applied to the imaging of the human thyroid. 3.7 MBq of cyclotron produced ^{124}I was given orally to seven patients presenting at a thyroid clinic. Positron emission tomography (PET) scans were produced between one and thirty-three hours after ingestion of isotope. All pictures correlated well with clinical findings, ultrasonic examination and standard sup(99m)Tc-pertechnetate thyroid emission scans. The PET scans gave much better definition than the pertechnetate scans but did not provide information on "inactive" thyroid areas as revealed by ultrasonic examination. Spatial resolution was of the order of 7 mm (full width half maximum) in the best case, and satisfactory images were obtained with as little as 0.074 MBq of positron emission in the whole gland. These results show great promise for the further application of this positron camera for in vivo human imaging.

44778 Automatic seed identification technique for interstitial implants using three isocentric radiographs. Rosenthal, M.S.; Nath, R. (A. W. Wright Nuclear Structure Laboratory, Yale University, New Haven, Connecticut 06511). *Medical Physics;* 10: No. 4, 475-479(Jul 1983).

A technique for the automatic reconstruction of the spatial coordinates of seeds in an interstitial implant has been developed. Seed coordinates from three isocentric radiographs, an anterior—posterior film, and an orthogonal pair of films taken at gantry angles of +- 45° from the anterior—posterior direction are digitized and recorded in a random sequence. From this, the three-dimensional coordinates of the seeds in the implant are computed by matching the values of common coordinates along the axis of rotation. This rotate and match technique leads to an accurate and consistent identification and reconstruction of seeds with 90% of them within 2 mm of their actual location. These new computer routines have been added to an existing treatment planning system (AECL TP-11 treatment planning system, version 5A). We present our algorithm and technique along with clinical examples.

44779 Application of technetium-99m-phosphate isomers in nuclear medicine. A comparative study. Morkel, H.R. Stellenbosch, South Africa; Stellenbosch University (1981). 57p. (In Afrikaans).

Thesis.

Many studies have been made to evaluate Technetium-99m-sodiumtripoliphosphate (S.T.P.P.) as a bone reagent. It was proved that Methylenediphosphate (M.D.P.) had better results. This study continues the research on M.D.P. and it's purpose is to find analogues and to formulate them.

44780 Development and application of radioimmunoassay methods for the serodiagnosis of intrauterine and congenital virus infections. Kangro, H.O. London, England; London University (1980). 230p.

Thesis.

The development of indirect solid-phase radioimmunoassay (RIA) procedures for qualitative and quantitative determinations of immunoglobulin (Ig) class-specific antibodies against rubella and cytomegalovirus (CMV) is described. RIA for the detection of virus-specific IgG class antibodies was found to be on average 40-130 times more sensitive than the conventional tests and could easily be adapted to provide simple and reliable screening tests for immunity to rubella and CMV. It was shown that IgG class antibodies do not significantly interfere with virus-specific IgM class antibody determinations by RIA and therefore this technique could be used for testing serum samples without prior fractionation. The detection of rubella-specific IgM class antibody determinations by RIA was found to be a practical, sensitive and specific procedure which could provide a reliable method for the diagnosis of recent rubella infection. Results are also presented which show that RIA for rubella IgM antibodies is as specific as the conventional fractionation procedures currently used for the diagnosis of congenital rubella but much more sensitive. A preliminary evaluation of RIA for CMV-specific IgM class antibodies strongly indicated that this technique may also prove to be superior to current methods for the serodiagnosis of recent and congenital CMV infections.

5507 Microbiology

REFER ALSO TO CITATION(S) 43187, 43418, 43419, 43460, 43462, 43463, 43464, 43466, 43467, 43518, 43520

44781 Acid-gas bioconversion favors sulfur production. Cork, D.J.; Ma, S. (Illinois Inst. of Tech., Chicago). *Biotechnology and Bioengineering Symposium;* No. 12, 285-290(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Chemical acid-gas conversion systems are available for converting H_2S to S^0. These include the Claus and Stretford processes. a photosynthetic anaerobic bioprocess for acid-gas removal has been developed which utilizes carbon dioxide instead of O_2 as the final electron acceptor. The carbohydrate produced by this reaction is of the general formula (CH_2O)/sub n/ and the photoautotrophic microorganism which catalyzes acid-gas bioconversion is Chlorobium thiosulfatophilum. Although orthorhombic sulfur is excreted by Chlorobium, the production of oxidized sulfur compounds decreases the yield of elemental sulfur from H_2S, and it is therefore desirable to control this side reaction. This article describes how the production of sulfate may be retarded. The factors studied were the effect of H_2S molar flow rate on the conversion of H_2S to SO_4^{-2} and the effect of space velocity on the percentage conversion of H_2S to SO_4^{-2}. A higher percentage H_2S conversion to sulfate was associated with lower H_2S gas inflow rates; and at low space-velocity, a high conversion of H_2S to SO_4^{-2} was achieved. 3 figures. (DP)

44782 Cellulase production in continuous and fed-batch culture by Trichoderma reesei MCG80. Allen, A.L.; Andreotti, R.E. (Army Natick Research and Development Labs., MA). *Biotechnology and Bioengineering Symposium;* No. 12, 451-459(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

Continuous culture of Natick's strain MCG80 of Trichoderma reesei at a dilution rate of 0.028 h^{-1} has yielded a cellulase titer of over 61 U/mL using 5% lactose as the sole carbon source. Enzyme productivity at this dilution rate is 168 IU/L/h. Repeated fed-batch cultures using this strain on lactose as the carbon source have titers of 10 IU/mL with productivities in excess of 100 IU/L/h. 5 figures, 1 table.

44783 Characterization of β-1,4-glucosidase activity in Thermoanaerobacter ethanolicus. Mitchell, R.W. (Univ. of Pennsylvania, Philadelphia); Hahn-Haegerdal, B.; Ferchak, J.D.; Pye, E.K. *Biotechnology and Bioengineering Symposium;* No. 12, 461-467(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The β-1,4-glucosidase activity of Thermoanaerobacter ethanolicus was characterized using p-nitrophenyl-β-D-glucoside (PNPG) and cellobiose as substrates. The PNPGase and cellobiase activities were found to be cell associated. The enzymatic activities had a broad pH optimum in the range of 5 to 7, and a temperature optimum at 70°C. The apparent K/sub m/ was 4.0mM for PNPG, and 4.2mM for cellobiose. The half-lives of both activities were about three days, two days, and less than one-half day at 45, 55, and 65°C, respectively. The correspondence of characteristics for the PNPGase and cellobiase activities suggests that a single enzyme was active on both substrates. The β-glucosidase activity was inhibited to 20% of full activity in the presence of a glucose concentration of 2.5%, with PNPG as the substrate. 6 figures.

44784 Continuous fermentation: improvement of cell immobilization by zeta potential measurement. Michaux, M.; Paquot, M.; Baijot, B.; Thonart, P. (Faculte des Sciences Agronomiques de l'Etat, Gembloux, Belgium). *Biotechnology and Bioengineering Symposium;* No. 12, 475-484(1982). (CONF-820580—).

From 4. symposium on biotechnology in energy production and conservation; Gatlinburg, TN, USA (11 May 1982).

The influence of various agents such as inulin, proteins, and cationic polymers on the zeta potential of yeast cells has been studied. With various agents, it appears feasible to give a positive charge to the cell and a negative one to the carrier. Under these conditions, the yield of immobilization (mg cells/g support) is significantly improved. This is the case with various agents such as proteins and cationic polymers. For example, the yeild of cell immobilization (Saccharomyces) on sawdust varied from 94.2 to 145.8 mg/g of support with addition of gelatin (0.05%). The results demonstrate the influence of zeta potential on cell immobilization by adsorption. These immobilized cells are advantageously used in continuous production of ethanol. 3 figures, 8 tables.

5508 Morphology

44785 Parental investment in the chicken turtle (Deirochelys reticularia). Congdon, J.D.; Gibbons, J.W.; Greene, J.L. (Savannah River Ecology Lab., Aiken, SC). *Ecology;* 64: No. 3, 419-425(1983).

Eggs of the chicken turtle (Deirochelys reticularia) were collected in South Carolina from clutches laid in the spring and fall. Clutch size averaged 8.0 eggs (2 SE = 1.6; n = 15) and was weakly correlated with body size of the female. Wet mass of the clutch averaged 72.4 g (2 SE = 11.6, n = 15). There were no significant differences in clutch size or wet mass between spring and fall nesting seasons. Individual eggs laid in the fall (anti x = 10.7 g) were significantly larger than those laid in the spring (anti x = 8.5 g). Fifteen eggs laid in the spring and incubated at 29° +- 2°C averaged 152 d to hatching. Hatchling plastron length averaged 24.3 mm, and body wet mass was 6.7 g. Hatchlings (dry mass) contained 27.4% lipid, and the lipids remaining in the neonate at hatching represented 61% of the lipids originally present in the egg. The wet mass of a hatchling is highly correlated with wet mass of the egg. In contrast to clutch size, egg size had a strong positive relationship to body size. A morphological constraint, the width of the pelvic canal, is proposed as having an influence on this relationship. The negative relationship between an optimized egg size and clutch size was not evident, so current optimality models do not appear to be applicable to Deirochelys.

5510 Physiological Systems

44786 (PNL-SA—9839) Transplacental differences in Ca, Na, K, and electropotential in the guinea pig. Kelman, B.J.; Twardock, A.R. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 26p. NTIS, PC A03/MF A01. Order Number DE83015090.

The fetal side of hemochorial placentas from guinea pigs between 58 and 62 days gestation were perfused in situ. Concurrent measurements were made of the clearances of radiocalcium and tritiated water from maternal to fetal circulation of the placenta, transplacental potential difference (TPD), maternal plasma and perfusate Ca, Na, and K concentrations, maternal blood pressure, gross permeability of albumin in the placenta, and net water movements. Movement of Ca from dam to fetus appeared to occur against an electrochemical gradient and was not associated with the movements of Na and K across the placenta. A negative correlation between perfusate Na and K concentrations, not dependent on maternal plasma Na and K concentrations and abolished by high concentrations of Ca in the fetal circulation of the placenta, strongly supports the concept of a Na-K exchange mechanism in the placenta directed so that K is moved against a concentration gradient towards the dam. There was no evidence that the TPD existed at the site of maternal-fetal exchange for Ca, Na, or K.

5530 Agriculture And Food Technology

REFER ALSO TO CITATION(S) 43390

56 BIOMEDICAL SCIENCES, APPLIED STUDIES

5601 Radiation Effects

REFER ALSO TO CITATION(S) 43334, 43335, 43336, 43394, 44767

44787 (CONF-830710—3) Radiation-induced mutagenicity and lethality in Salmonella typhimurium. Isildar, M.; Bakale, G. (Case Western Reserve Univ., Cleveland, OH (USA). Div. of Radiation Biology). 1983. Contract AC02-78EV04746. 3p. NTIS, PC A02/MF A01. Order Number DE83014653.

From 7. international conference of radiation research; Amsterdam, Netherlands (3 Jul 1983).

The mutagenic and lethal effects of ionizing radiation on histidine-deficient auxotrophs of Salmonella typhimurium were studied to improve the understanding of radiation damage to DNA. The auxotrophs were divided into two groups - one which is sensitive to base-pair substitutions and another sensitive to frameshifts. These groups were composed of parent-daughter pairs in which the chemical mutagenicity enhancing plasmid, pKM101, is absent in the parent strain and present in the daughter. Co-60 γ-radiation and 250 kV x-rays were used to irradiate the bacteria. Irradiation of the frameshift - sensitive strains which carry the pKm101 plasmid doubled the absolute number of induced revertants whereas irradiation of the base-pair substitution sensitive strain which also carries the pKm101 plasmid produced nearly no change in the number of induced revertants. A nearly negligible effect on the mutation rate was observed for all parent strains. (ACR)

44788 (DOE/EV/04568—35) Repair and cell cycle response in cells exposed to environmental biohazards. Progress report, 1 June 1982-31 May 1983. Billen, D.; Hadden, C.T. (Tennessee Univ., Oak Ridge (USA). Graduate School of Biomedical Sciences; Oak Ridge National Lab., TN (USA)). 1983. Contract AS05-76EV04568. 9p. (ORO—4568-35). NTIS, PC A02/MF A01. Order Number DE83015031.

The research program has attempted to determine low environmental agents, especially ionizing radiation, interact with DNA and how the cells respond to the resulting damage. The focus has been on the spectrum of damage generated in DNA, the kinds of damage that can be repaired, and the mechanisms of repair. The effects of radioprotective agents and certain sensitizing conditions on breakage of DNA in bacterial cells by ionizing radiation, and mechanisms of enzymatic excision of pyrimidine dimers and other DNA adducts have been studied. (ACR)

44789 (DPSPU—83-30-3) Beta dosimetry at a nuclear fuel separation facility. Crase, K.W.; Hall, R.M. Jr. (Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant). 1983. Contract AC09-76SR00001. 29p. (CONF-830204—12). NTIS MF A01. Order Number DE83014366.

From International beta dosimetry symposium; Washington, DC, USA (15 Feb 1983).

Microfiche only, copy does not permit paper copy reproduction.

Beta radiation exposures at Savannah River Plant (SRP) are reviewed. Maintenance mechanics and laboratory technicians receive the highest doses. (ACR)

44790 (GSF-BPT—1/82) Influence of enhanced UV-B irradiation on the growth and composition of plants. Tevini, M.; Iwanzik, W. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Bereich Projekttraegerschaften). Feb 1982. 189p. (In German). NTIS (US Sales Only), PC A09/MF A01. Order Number DE83750918.

Barley (Hordeum vulgare), corn (Zea mays), bean (Phaseolus vulgaris), and radish (Raphanus Sativus) were irradiated under a lighting device for 5 to 10 days continuously at an increased UV-B fluence rate. These four species reacted differently to the elevated UV-radiation in their growth parameters, composition and leaf surface. Bean seedlings incurred the greatest damage, radish and barley seedlings less damage, and corn seedlings were hardly affected. The fresh weight, loaf area and chlorophyll, carstenoid and galactolipid contents were reduced in all species, whereas protein contents were increased throughout compared to controls. An approx. 50% increase in flavaroid content was noted in barley and radish seedlings. Studies on barley seedlings showed the effects on growth parameters and composition to be more market with increasing UV-B fluence rate. Fresh weights, chlorophyll and carotinoid contents were reduced proportionately, in contrast to flavaroid content which increased with increasing fluence rate to 180% of the control value. A bronze discolouration of the leaves appeared regularly at the highest fluence rate.

44791 (IAEA-R—1896-F) Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982. Hilmy, N. (International Atomic Energy Agency, Vienna (Austria)). Jan 1982. 104p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702069.

The results are presented of a four year coordinated research programme related to: effects of gamma radiation on chloramphenicol and hydrocortisone acetate mixture eye ointment, methodology

of biological dosimetry, radiation sterilization dose setting using fraction positive and most resistant microbes, effects of gamma radiation on neomycin sulphate and procaine penicillin G in solid state, and calibration of panoramic batch irradiation using Ceric dosemeter.

44792 **(IAEA-R—2618-F) Sterilization of topical products by cobalt-60. Coordinated programme in practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 August 1980 - 31 July 1981.** Chong-Kook Kim. (International Atomic Energy Agency, Vienna (Austria)). Jan 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702070.

The purpose of the test was to determine whether ointment can be sterilized or not by Co-60 irradiation. To evaluate the effect of radiosterilization, biological and physico-chemical tests have been performed. The effects of the Co-60 irradiation have always been compared with non-irradiated standard. The results showed that the ointment vehicles which were exposed in the air and contaminated from the surroundings contained no survivor germs after the irradiation with 2.5 Mrad doses. B. subtilis and B. pumilus which were artificial contaminants of ointment vehicles could not be detected after irradiation with 2.5 Mrad doses. The quantitative determinations of two ingredients (gentamicin and bufexamac) in ointments did not show changes between before and after irradiation. For the ointment vehicles no appearance changes have been observed, except slight discoloration. A change in hardness was observed after irradiation.

44793 **(INIS-mf—7673) Salmonella radicidation of poultry carcasses.** Mulder, R.W.A.W. (Landbouwhogeschool Wageningen (Netherlands)). 19 May 1982. 172p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE83780887.

Thesis.

This thesis reports investigations using gamma-radiation to decontaminate poultry carcasses. The application to foods of doses of ionizing radiation sufficient to reduce the number of viable specific non-sporeforming pathogenic microorganisms so that none is detectable in the treated food by any standard method is termed radicidation. The doses used in this study were at such a level that no undesirable or unfavourable side-effects occurred. The effects of these doses were studied on salmonellae and other microorganisms present in, or associated with poultry carcasses and in liquid and on solid culture media as well. Decimal reduction (D_{10}) values were estimated. These represent the dose (kGy) required to achieve a reduction in initial colony count from N_0 to 0.1 N_0. Together with the estimation of the numbers of Salmonella present per carcass the data were used to predict the effect of an ionizing radiation treatment of poultry. Data on the effect of ionizing radiation on the total microflora of poultry carcasses were also collected.

44794 **(INIS-mf—7681) Influence of hyperthermia on the biological effects of low LET-radiation with different energy spectra.** Schrader-Reichhardt, U. (Goettingen Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet). 24 Apr 1981. 133p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780882.

Thesis.

In this work the impact of hyperthermia or radiation alone and of hyperthermia in combination with radiation had been studied with a view to the survival of CHO-cells (hyoptetraploid, so-called 4n, and diploid, 2n) in the colony-test and with a view to the fabrication of DNA-strand breaks. The results are studied in close relation to the LET-dependence of the RBW already studied for densely ionizing radiation and, as far as already known, of the TVF. Possible fundamentals of the enhancement of the radiation effect by hyperthermia are discussed.

44795 **(INIS-mf—7682) Impact of cofactors and inhibitors on DNA repair synthesis after γ-irradiation in semi-permeable Escherichia coli cells.** Gaertner, C. (Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Bio- und Geowissenschaften). 22 Jul 1981. 140p. (In German). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780884.

Thesis.

The DNA-repair synthesis in tuluol-permeable E. coli cells after γ-irradiation has been investigated in dependence on the cofactors. ATB and NAD by means of enzyme kinetics. A partly repair-deficient mutants were taken into consideration which are well characterized in view of molecular biology; they showed which enzyme functions participate in the γ-induced DNA repair synthesis. The inhibition of the DNA-repair synthesis by the intercalary substances Adriamycin and Proflavin has been described and compared with the survival rates after irradiation and after combined treatment by irradiation and intercalary agents.

44796 **(INIS-mf—7683) Correlation of radiation sensitivity and nitrofurantoin sensitivity of Escherichia coli K-12.** Kloeck, K. (Muenchen Univ. (Germany, F.R.)). 10 Mar 1981. 44p. (In German). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83780885.

Thesis.

The Uvr- and rec-mutants of E.coli K-12 have been tested with a view to their radiation- and nitrofuration sensitivity. The tests showed that all mutants tested were more radiation- and NF-sensitive than the wild type AB 1157. When the NF-sensitivity had been compared to the UV- and X-ray sensitivity it became obvious that the NF-sensitivity is correlated to the UV-sensitivity. Studies carried out with regard to the time dependence of the NF-effect on E.coli showed that the effect of NF on E. Coli became weaker after about 1 1/2 to 2 hours. That is possibly caused by the fact that the E. coli bacteria succeed in reducing the NF to an inactive form. By means of nitrosoguanidine mutants of E-coli AB 1157 had been induced and by means of the Replicite Plating Method, NF-sensible mutants had been isolated from the plutonium mixture. Among the mutants which had been isolated by this method, 74% had been more UV-sensitive than the wild type and 55% more X-ray sensitive. Thus NF-sensitive mutants have not necessarily to be considered as rec-mutants as there are also uvr-mutants in the mixture.

44797 **(INIS-mf—7687) Effect of some radioprotective and radiosensitizing substances on the semiconservative and unscheduled DNA biosynthesis of rat thymocytes.** Winkle, J. (Muenchen Univ. (Germany, F.R.). Fachbereich Tiermedizin). 27 Feb 1981. 102p. (In German). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780883.

Thesis.

The effect on the semiconservative and unscheduled insertion of ^{3}H-methyl-thymidine (TdR-^{3}H) into the DNA was tested on rat thymocytes in vitro. The semiconservative incorporation of TdR-^{3}H was inhibited by AET, cysteine glutathione, N-ethylmaleimide, cytosine arabinoside, ethidiumbromide, bleomycin and diethyldithiocarbamate. Metronidazole and caffeine had no effect. Aminothiols and bleomycin stimulated, cytosine arabinoside, N-ethylmaleimide, ethidiumbromide and diethyldithiocarbamate decreased the unscheduled TdR-^{3}H incorporation. There was no substantial effect of an exposure to UV-rays. The results lead to the following conclusions: The aminothiol-effect on the excision repair suggest that inhibition of the semiconservative DNA-synthesis will amplify regenerative capacity of the cells. The effect of most substances investigated accord with the present views on their mechanisms of action. The present investigations do not allow an explanation of the influence of diethyldithiocarbamate unspecific effects (such as complexing activity) and more specialized reactions (such as inhibition of superoxide dismutase) must be kept in mind.

44798 **(KFK—3432) Alpha radiation-induced alterations of the proliferation kinetics, chromatin structure and gene expression in mammalian cells.** Hieber, L. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Genetik und Toxikologie von Spaltstoffen). Jan 1983. 79p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750908.

Exponentially growing mammalian cells were exposed to 3.4 MeV alpha particles. The chromatin of cells arrested in G2 by alpha irradiation was severely damaged, though all cells were still capable to condensate their chromatin after fusion with mitotic cells. In addition to the common types of aberrations (breaks, gaps, dicentrics and exchanges) cells were found possessing one or more

chromosomes with long stretches of undercondensed chromatin. Repair of these lesions was indicated by site specific unscheduled DNA synthesis and by the observation that condensation of these regions improved during G2 arrest. Furthermore, during G2 arrest the synthesis of two cellular proteins was stimulated. This was studied by two-dimensional gel electrophoresis of ^{35}S-methionine labeled cellular proteins. All these findings provided evidence that radiation-induced G2 arrest is caused by chromatin damage, which prevents regular chromosome condensation for mitosis.

44799 **(KFK—3462) Biological effects of radium.** Drosselmeyer, E. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit). Dec 1982. 208p. (In German). NTIS (US Sales Only), PC A10/MF A01. Order Number DE83750920.

It is evident from a survey of the current literature that a problem exists in finding the correlation between the exposure of the human body to radiation, with the subsequent development of diseases, particularly for certain types of cancer. A brief history of the early experiences of radium incorporation into humans is given followed by data collected on some important polulation groups exposed to radium body burden, such as miners in rare metal and uranium mines, dial painters and some groups of patients. The medical and technical applications of radium are discussed. A summary is also given of the natural occurence of radium and the amounts in which it is present in the environment. Incorporation, retention and excretion pathways are outlined. In order to study the metabolism and the induction of diseases by radium several animal studies have been performed. The ICRP regards radium-226 as the best known and most studied radionuclide. It can thus serve as a guideline for setting limits for other radionuclides, e.g. plutonium. The valid limiting value for radium-226 of 0.1 μCi for whole body exposure is generally accepted and regarded as sufficiently safe. Finally, transfer factors have been collected as fas as they were available in the literature.

44800 **(LA—9804-MS) Case-control study of brain tumors among white males employed at the Rocky Flats Plant.** Reyes, M.; Wilkinson, G.; Tietjen, G.; Voelz, G.; Acquavella, J.; Bistline, R. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 14p. NTIS, PC A02/MF A01. Order Number DE83014822.

We conducted a case-control study of 16 primary brain tumor deaths occuring among white males employed at the Rocky Flats Plant during 1952 to 1980 to investigate the relationship between these tumor cases and occupational radiation/nonradiation exposures. Three mutually exclusive control groups were selected from the white male employees: matched (individually matched on age and period of employment), deceased, and random. Each group consisted of a 4:1 control-case ratio. Analyses for exposure to internally deposited plutonium and external penetrating radiation were based on health physics dosimetry measurements. Potential exposure to nonradiation hazards was analyzed by job title and work area. Because evidence of exposure to beryllium and uranium existed in only one case, we did not analyze for these exposures. Our study showed no statistically significant association between exposure to internal radiation and brain tumor. We found no statistically significant differences in external radiation exposure between the tumor cases and the three control groups. In addition, no nonradiation occupational risk factors were identified.

44801 **(UCRL—88257) Cytometric analysis of mammalian sperm for induced morphologic and DNA content errors.** Pinkel, D. (Lawrence Livermore National Lab., CA (USA)). 27 Jun 1983. Contract W-7405-ENG-48. 37p. (CONF-8210110—3). NTIS, PC A03/MF A01. Order Number DE83014961.

From International symposium on biological dosimetry; Neherberg, F.R. Germany (14 Oct 1982).

Some flow-cytometric and image analysis procedures under development for quantitative analysis of sperm morphology are reviewed. The results of flow-cytometric DNA-content measurements on sperm from radiation exposed mice are also summarized, the results related to the available cytological information, and their potential dosimetric sensitivity discussed. (ACR)

44802 **Dosimetry of internal emitters.** Heinrichs, K.; Kaul, A. *STH-Berichte;* 1-162(1982). (In English and German).

Age dependent values of the radiation dose absorbed due to internal emitters are needed as well for the medical use of radionuclides as for the estimation of risks associated with the releases of radioactive material to the environment by nuclear industry. This investigation develops methods of calculation and presents data concerning the age dependence of the physical parameters which determine the values of radiation doses.

44803 **Binding of the rat liver thyroid hormone nuclear receptor to deoxyribonucleic acid using a gel filtration assay.** Ricketts, M.H. Stellenbosch, South Africa; Stellenbosch University (1979). 114p.

Thesis.

An assay for the binding of the thyroid hormone nuclear receptor to DNA is described. The nuclear receptor for T_3 binds to both duplex and single-stranded DNA. The binding capacity of duplex DNA is twice that of single-stranded DNA at 50 mM NaCl. This indicates that the receptor is not a DNA-melting protein. The interaction of the nuclear receptor for T_3 with duplex DNA exhibits is pH optimum in the physiological range whereas with single-stranded DNA the interaction exhibits no optimum and therefore appears to be purely electrostatic. From this it is concluded that the binding of the receptor to duplex DNA shows a higher degree of specificity involving more than just an electrostatic interaction. The [^{125}I]T_3-receptor binds to all natural and synthetic DNA's tested. Of all the DNA's tested the sequence poly(dG) poly(dC) has the greatest capacity for the receptor at low salt concentrations. Furthermore, significant binding occurs to phage T2 DNA. This suggests that binding of the receptor to DNA occurs in the minor groove to a G-C-rich sequence. The presence of [^{125}I]T_3 bound to the receptor does not significantly influence the association of the receptor with DNA, indicating that the receptor possibly does not function in a manner similar to the lac repressor of E. coli.

5602 Thermal Effects

REFER ALSO TO CITATION(S) 43263, 44794

44804 (CONF-8208123—, pp 617-627) **Biological monitoring of thermal effects of cooling water discharges from Danish power plants.** Moeller, B.; Dahl-Madsen, K.I. (Water Quality Institute,Hoersholm, Denmark). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

In the years from 1970 to 1982, 52 site studies and monitoring studies have been carried out at major existing and planned power plants. The results from the studies have been used in a planning system for water quality. This planning system, which is water qualitative related, is described in this paper. An important part of the planning system in the description of size distribution of excess temperature fields and the related biological conditions. In the biological monitoring, emphasis is placed on the benthic community as more vulnerable to the cooling water discharge. The studies have shown that the excess temperature field within the 2°C isotherm can produce measurable changes in the benthic community. The temperature effect in the pelagic zone is marginal, however, some effects are seen at sites with a deep water intake of nutrient rich water. Entrainment of fish and zooplankton can be important in bays and estuaries.

5603 Chemicals Metabolism And Toxicity

REFER ALSO TO CITATION(S) 43227, 43241, 43504, 43737, 44687, 44731, 44732, 44741, 44741, 44743

44805 **(CEA-tr—1-739-6) Beryllium health hazards.** Preuss, O.; Oster, H. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). 9 Feb 1982. 15p. (In French). NTIS (US Sales Only), PC A02/MF A01/ Available from CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France). Order Number DE83750926.

Translated from Arbeitsmed. Sozialmed. Praeventivmed. v. 15, no. 11, 1980 p. 270-275.

Pathological and clinical characteristics of beryllium disease are discussed with emphasis on present day production and fabrication aspects of beryllium and its compounds. Recent epidemiological experiences proving the effectiveness of applied preventive measures and confirming the role of assumed immune factors are presented to clarify misleading information based on earlier, meanwhile obsolete production technology and inadequate, often nonexisting preventive practices. Items stressed are: (1) Skin and acute respiratory reactions will occur only with exposure to water soluble extraction intermediaries but never from contact with finished beryllium products. (2) No cases of chronic beryllium disease have occurred whenever exposures were kept at or below the recommended TLV of 2 $\mu g/m^3$ per 8 hour daily weighted average or 25 $\mu g/m^3$ maximum for 30 min. (3) Presence of predisposing hypersensitivy factors and minimum exposure significantly above the TLV are prerequisite for the development of chronic beryllium disease. (4) Laboratory animals exposed to beryllium salts or oxides may develop benign or malignant tumors. Reports of increased observations of lung cancer among berylliumworkers have been published but reveal great inadequacies regading methodology and objectivity

44806 (CONF-8208123—, pp 504-512) **Effects of coal combustion and acidification on the cadmium exposure of the Swedish population.** Ramberg, L. (Studsvik Energiteknik AB, Nykoeping, Sweden). 1982. NTIS (US Sales Only), PC A99/MF A01.

From International conference on coal fired power plants and the aquatic environment; Copenhagen, Denmark (16 Aug 1982).

Prior to the industrial era, cadmium levels in nature were very low. This highly toxic metal has since been introduced to an increasing extent in the biosphere where it migrates and accumulates in a way similar to the essential metal zinc although cadmium has no potential biological function. For analyzing complex biological flow patterns and their changes with time mathematical models have proved to be an effective tool. For most toxic substances, mathematical models are limited by the relative absence of data which quantify flow patterns and environmental impact. In the case of cadmium, however, there is an unusual amount of information on the relationships between soil properties and uptake in plants and on the physiological effects of cadmium intake on mammals and man. Quantitative expressions between dose and response make it possible to analyze the total chain of events from the release of cadmium at a source to the final effect on human health. For this purpose a model has been developed and applied for release situations which might occur in South and Middle Sweden.

44807 **(NP—3770186) Fucus Vesiculosus as a bioaccumulator of heavy metals.** Steinhagen-Schneider, G. (Kiel Univ. (Germany, F.R.). Inst. fuer Meereskunde). 1981. 64p. (In German). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83770186.

The accumulation of Cd and Pb and possible influences of temperature, salinity, and metal combinations were studied. Seasonal variations of the natural heavy metal contents of Fucus were further analysed. The natural heavy metal concentrations showed significant seasonal variations, which are mainly ascribed to the seasonal fluctuations of water temperature and salinity. The Zn contents of Fucus reached their maximum in February and their minimum in September. The maximum of Pb concentrations were found in samples taken in August, while the minimum was in February. The Cd contents of Fucus was also highest in August. The rates of net uptake of Cd and Pb revealed significant positive correlations with temperature and negative correlations with salinity; in all cases observed, the impact of temperature was more distinct than that one of salinity. The accumulation of Cd was increased by the presence of Pb and Zn in the medium. The incorporation of Pb was decreased by the presence of Cd and/or Zn. Thus, it seems useful to include Fucus vesiculosus as a very suitable content indicator for heavy metals in monitoring programmes.

44808 **Introduction and perspectives of plant genetic and cytogenetic assays.** Constantin, M.J. (Univ. of Tennessee, Knoxville); Owens, E.T. *Mutation Research;* **99**: 1-12(1982). Contract W-7405-ENG-26.

The use of plants for mutagen screening is assessed in this report. Discussion is presented under the headings: relative status of plant genetics and cytogenic assays; and relevance of mutagenicity and clastogenicity data from higher plants to those from other organisms. (DMC)

44809 **Chromosome aberration assays in barley (Hordeum vulgare).** Constantin, M.J. (Univ. of Tennessee, Knoxville); Nilan, R.A. *Mutation Research;* **99**: 13-36(1982).

Barley is an exceellent organism for studies of induced chromosome aberrations because of its few ($2n = 2x = 14$) relatively large chromosomes. Root-tip and shoot-tip cells have been used extensively for the study of ionizing radiation-induced chromosome aberrations. The general procedures are well known, the technology is simple and easy to learn, and the assays are relatively quick and inexpensive. Both root tips and shoot tips can be used for the study of chemical mutagens as well as ionizing radiations. Pollen mother cells are well suited for studying the effects of mutagens on meiotic chromosomes. The literature review for the Gene-Tox Program reported on 61 chemicals tested for their effects on barley chromosomes. Of these, 90% were reported to be either positive or positive dose-related, while 7% were negative and 3% were questionable. Barley assays based on chromosomal aberrations are useful to detect the clastogenic potency of chemicals under laboratory conditions. Indications are that the data from barley can be used to corroborate data obtained from other organisms. Among the classes of chemicals assayed were: alcohols and phenols; alkaloids; epoxides; alkyl sulfates; amides and sulfonamides; aromatic amines; aryl halides; aziridines; alkenes; carbamates; hydroazides; nitroaromatics; nitrosamides; nitrosources; phenothiazines; and polycyclic aromatic hydrocarbons.

44810 **Chromosome aberration assays in Allium.** Grant, W.F. (McGill Univ., Ste. Anne de Bellevue, Quebec). *Mutation Research;* **99**: 273-291(1982).

The common onion (Allium cepa) is an excellent plant for the assay of chromosome aberrations after chemical treatment. Other species of Allium (A. cepa var. proliferum, A. carinatum, A. fistulosum and A. sativum) have also been used but to a much lesser extent. Protocols have been given for using root tips from either bulbs or seeds of Allium cepa to study the cytological endpoints, such as chromosome breaks and exchanges, which follow the testing of chemicals in somatic cells. It is considered that both mitotic and meiotic end-points should be used to a greater extent in assaying the cytogenetic effects of a chemical. From a literature survey, 148 chemicals are tabulated that have been assayed in 164 Allium tests for their clastogenic effect. Of the 164 assays which have been carried out, 75 are reported as giving a positive reaction, 49 positive and with a dose response, 1 positive and temperature-related, 9 borderline positive, and 30 negative; 76% of the chemicals gave a definite positive response. It is proposed that the Allium test be included among those tests routinely used for assessing chromosomal damage induced by chemicals.

44811 **Biological effects of acidity in precipitation on vegetation: a review.** Evans, L.S. (Brookhaven National Lab., Upton, NY). *Environmental and Experimental Botany;* **22**: No. 2, 155-169(1982).

Acidic precipitation, wet or frozen deposition with a hydrogen ion concentration greater than 2.5 μsec/l is a significant air pollution problem in the United States and Canada. The chief anions accounting for the hydrogen ions in rainfall are nitrate and

sulfate. Although visible injury to foliage has been documented in a variety of greenhouse studies, no experimental evidence demonstrates loss of field crop value or reduction in plant productivity due to visible foliar injury. Acidic precipitation can contribute nutrients to vegetation and could also influence leaching rates of nutrients from vegetation. Although these processes occur, there are no data that show changes in nutrient levels in foliage that relate to crop or natural ecosystem productivity. Experimental results show that fertilization of ferns is inhibited by present levels of acidic precipitation in the northeastern United States. However, the overall impacts of inhibited fertilization on perpetuation of the species or ecosystem productivity have not been evaluated. Simulated acidic precipitation has been shown to affect plant pathogens in greenhouse and field experiments. Simulated acidic precipitation inhibited pathogen activities under some circumstances and promoted pathogen activities under other circumstances. No general conclusions can be drawn about the effects of current levels of precipitation acidity on plant pathogen-host interactions under field conditions. Few experiments have been aimed at determining the impacts of acidic precipitation on crop and forest yields. Most of these studies are inadequate because they are not conducted in nature with adequate randomization of treatments coupled with vigorous statistical analyses. From the above information, it must be concluded that research on the effects of acidity in precipitation on terrestrial vegetation is too meager to draw definitive conclusions about the effects of ambient and/or anticipated levels of acidity.

5604 Other Environmental Pollutant Effects

REFER ALSO TO CITATION(S) 43994

44812 **(SVF—99) Proposals for acoustical requirements of the heating and power industry.** Westerberg, G. (Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden)). Oct 1982. 26p. (In Swedish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750781.

Portions are illegible in microfiche products.

The production process in the power and heating industry produces both internal and external noise. In many cases authority regulations are directly applicable. In some other cases acceptable noise levels have to be determined by comparison to related branches e.g. criteria for office buildings. This report summarizes avilailable noise regulations with regard to the power and heating industry both for direct use and for comparison. Furthermore an overview is presented on subjects like noise prediction problems, noise level guarantees, follow up measurements and cost efficiency aspects.

58 GEOSCIENCES

5801 Geology And Hydrology

REFER ALSO TO CITATION(S) 43362, 43371, 43372, 43379, 43386, 44817, 44818

44813 **(ONWI—480) Data reference and retrieval system for Richton Dome, Mississippi: annual status report for fiscal year 1982.** (Ertec Western, Inc., Long Beach, CA (USA)). Jun 1983. Contract AC06-76RL01830;AC02-83CH10140. 168p. NTIS, PC E07/MF A01. Order Number DE83015419.

Includes 2 sheets of 24x reduction microfiche.

The Geologic Data Base for Richton Dome, Mississippi, was updated and expanded in FY 82 to support National Waste Terminal Storage characterization studies. The existing data base, consisting of references, maps, remote sensing data, and well-boring information, was inventoried to catalog the data acquired during previous studies. This catalog is maintained on Ertec's in-house computer. Bibliographies of selected documents were reviewed and commercial data bases were searched to identify additional references pertinent to future geologic characterization studies to be added to the data base. In addition to the references, selected preliminary safety analysis report sections and associated reports for nuclear generating stations, oil and gas well completion records, and US Geological Survey System 2000 hydrologic data were obtained for specific areas of Mississippi and Alabama. These additional data and references provide a comprellensive and current data base for Richton Dome.

44814 **(SAND—83-0672C) Heuristic method for measurement and characterization of river meander wavelength.** Sinnock, S.; Rao, A.R. (Sandia National Labs., Albuquerque, NM (USA); Purdue Univ., Lafayette, IN (USA). School of Civil Engineering). 1983. Contract AC04-76DP00789. 31p. (CONF-830767—1). NTIS, PC A03/MF A01. Order Number DE83015107.

From Symposium on erosion and sedimentation; Ft. Collins, CO, USA (27 Jul 1983).

Portions are illegible in microfiche products.

Historically, meander planform data have been analyzed by various statistical and geometrical techniques but uncertainty persists about the wavelength, frequency, and reference geometry. Therefore, meander wavelength was analyzed in the Fourier frequency domain by power spectral analysis in terms of hierarchical centerlines as a reference geometry, eliminating some of the subjective bias associated with wavelength measurements. Equally spaced sampling points were located along the talweg of meandering streams. Sample values were measured as the perpendicular distance to a reference line connecting meander-belt mid-points. This line, itself meandering, constitutes a river's second-order meander frequency which is analyzed with respect to a still higher-order reference line. Power spectra obtained from hierarchical reference lines of first- and second-order meanders of the White River in southern Indiana indicate discrete frequencies in each order. First- and second-order harmonics are observed at high and low frequencies. Complex meandering along the Dolores River in western Colorado is characterized by very low frequency energy in third-order meanders and successively higher frequency energy in second- and first-order meanders.

5802 Geophysics

REFER ALSO TO CITATION(S) 43343, 43343, 43356, 43875, 44821

44815 **(UCRL—89161) Isolating the climatogenic effects of volcanoes.** Ellsaesser, H.W. (Lawrence Livermore National Lab., CA (USA)). Jun 1983. Contract W-7405-ENG-48. 31p. (CONF-830766—1). NTIS, PC A03/MF A01. Order Number DE83014948.

From Meeting of experts on anthropogenic climatic change; Leningrad, USSR (4 Jul 1983).

Portions are illegible in microfiche products.

Attempts to isolate and quantify the climatogenic effect of volcanic eruptions have been based on at least two independent estimates of atmospheric transparency, four independent chronologies of volcanic eruptions and eight estimates of the relative magnitudes of their climatogenic potential (dust veil index, optical depth, etc.). A similar quantity of curves have been used as representing the evolution of the hemispheric or global mean temperature. While essentially all of such studies have noted an apparent coherence in time between major volcanic eruptions and falling surface temperatures, each found anomalies in the data which appear to contradict the assumed direct quantitative relationship between stratospheric dust loading and surface cooling. Among these were cooling in the absence of volcanoes or following non-explosive eruptions, onset of cooling before the eruption or before arrival of the volcanic dust cloud, greater cooling in the hemisphere receiving the least amount of volcanic dust, comparable degrees of cooling for stratospheric dust injections estimated to differ by up to two orders of magnitude, comparable cooling for isolated and for closely spaced series of eruptions and an unexplained cooling over a quarter century in which no major eruptions were detected. Is it not time to raise the question; are the climatic effects of volcanic dust clouds known - or merely believed.

44816 **Magmatic model for the Mount St. Helens blast of May 18, 1980.** Eichelberger, J.C.; Hayes, D.B. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Geophysical Research;* **87**: No. B9, 7727-7738(10 Sep 1982).

Analytical and numerical solutions to the hydrodynamic equations of motion, constrained by physical properties of juvenile ejecta in the Mount St. Helens blast deposit, were used to investigate magmatic conditions required to produce the initial devastating blast phase of the eruption of May 18, 1980. Evidence that the blast was magmatic includes equivalence in volume of juvenile blast ejecta to preeruption inflation of the cone, substantial vesicularity of this ejecta, and continued vesiculation of large juvenile clasts after eruption. Observed or inferred ejecta velocities of 100 to 250 m/s are shown to require 0.2 to 0.7 wt% water vapor preexisting in magma unloaded by a landslide 200 to 900 m thick. These conditions imply total magmatic water contents of 0.7 to 1.7 wt%, respectively. Such low required water content suggests that volcanic blasts may be regarded as a normal consequence of magma intrusion into an unstable edifice.

5803 Mineralogy, Petrology, And Rock Mechanics

REFER ALSO TO CITATION(S) 43296, 43302, 43360, 43361, 43363, 43369, 43370, 43371, 43372, 43373, 43385, 43388, 43392, 44813

44817 (LBL—11654) Petrology and radiogeology of the Stripa pluton. Wollenberg, H.; Flexser, S.; Andersson, L. (Lawrence Berkeley Lab., CA (USA)). Dec 1980. Contract AC03-76SF00098. 119p. (SAC—36). NTIS, PC A06/MF A01. Order Number DE83015417.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Both the quartz monzonite and the metavolcanic leptite which it intruded are strongly fractured. Two stages of fracture filling are evident; an earlier stage encompassing quartz, sericite, feldspar, epidote, and chlorite, and a later stage dominated by carbonate minerals. The Stripa quartz monozite is chemically and mineralogically distinct from other plutons in the region. Muscovite is the predominant mica in the quartz monzonite; biotite has been altered to chlorite, hornblende is absent, and accessory minerals are scarce. In contrast, in other plutons in the Stripa region, biotite and hornblende are prominent mafic minerals and accessory minerals are abundant. The Stripa quartz monzonite is also considerably more radioactive than the the leptite and other plutons in the region. Uranium and thorium abundances are both ~ 30 ppM, considerably higher than in normal granitic rocks where the thorium-to-uranium ratio generally exceeds 2. Potassium-argon dating of muscovite from the Stripa quartz monzonite indicates that this rock may be older, at 1691 million years than granitic rock of the neighboring Gusselby and Kloten massifs, whose ages, based on K-Ar dating of biotite, are respectively 1604 and 1640 m.y. Heat flow and heat productivity considerations show that although Stripa quartz monzonite contains high abundances of radioelements, the pluton has little efect on the regional heat flow. If it occurs in a layered plutonic setting, it is not more than 1.5 km thick; otherwise it may comprise a stock, dike, or border phase that is relatively small compared with the large granitic plutons exposed in the region.

44818 (LBL—12520) Geohydrological data from the macropermeability experiment at Stripa, Sweden. Wilson, C.R.; Long, J.C.S.; Galbraith, R.M.; Karasaki, K.; Endo, H.K.; DuBois, A.O.; McPherson, M.J.; Ramqvist, G. (Lawrence Berkeley Lab., CA (USA)). Mar 1981. Contract AC03-76SF00098. 184p. (SAC—37). NTIS, PC A09/MF A01. Order Number DE83015416.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The Macropermeability Experiment was conducted in a granite body adjacent to a recently abandoned iron ore mine at Stripa, Sweden. This experiment was conducted to measure the permeability of a large volume of low permeability, fractured rock. The experiment was conducted over 11 months in an approximately 4m x 4m x 33m drift at the 335 m level of the mine. Groundwater seepage into the drift was measured as the net moisture pickup of the ventilation system. Water pressure and temperature were monitored at 95 locations in the rock surrounding the drift. The data collection system was designed to provide in-situ averaging of the measured parameters, to ultimately estimate the hydraulic conductivity of the rock as if it were a porous medium. This report is limited to data presentation. It describes the types of data collected, the methods of measurement, and procedures used for data collection, storage, and reduction. Experimental errors are reviewed for all principal types of data. The data presented are sufficient to estimate (1) the rate of seepage of moisture into the drift; (2) the three-dimensional distribution of hydraulic head in the rock mass to a radial distance of 30 m from the drift; and (3) the three-dimensional distribution of temperature in the rock mass, also to a radial distance of 30 m. These data can in turn be used to estimate the intrinsic permeability of the monitored rock mass. Analysis and interpretation of these results will be presented in subsequent reports.

44819 (PNL-SA—10750) Selenium sorption on a Columbia River basalt. Ames, L.L.; Salter, P.F.; McGarrah, J.E.; Walker, B.A. (Pacific Northwest Lab., Richland, WA (USA)). Dec 1982. Contract AC06-76RL01830. 42p. NTIS, PC A03/MF A01. Order Number DE83015436.

Sodium selenate and $Na_2{}^{75}SeO_4$ were used with a synthetic groundwater and hydrazine to determine selenate-selenium sorption characteristics of crushed Umtanum basalt between 40 to 60°C. Selenium sorption kinetics from both oxidizing and reducing solutions followed an equation of the type (C/sub I/-C) = Kt/sup b/, where C/sub I/ was the initial selenium concentration in molarity, C was the selenium concentration in molarity at time t in hours, and K and b are constants. Relatively constant b values of a wide C/sub I/ range allowed K determination over the whole initial concentration range investigated (C/sub I/ = ~ 10^{-5} to 10^{-12} M). Selenium desorption kinetics in 60°C oxidizing systems were described by C = At/sup d/, where A and d are constants and other quantities defined above. Equilibrium results conformed to a Freundlich sorption isotherm. The enthalpy change was independent of temperature within the range studied and yielded ΔH values of from +27.23 kcal/mole at 1.266 x 10^{-14} moles Se/g basalt to +28.47 kcal/mole at 2.061 x 10^{-9} moles Se/g basalt. Chemisorption was indicated by the magnitude of the enthalpy change. Desorption kinetics at 60°C were only modestly less rapid than sorption kinetics suggesting a relatively small sorption activation energy. Reduced (Eh = -150 to -200 mV) selenium did not desorb.

44820 Special problems in making geotechnical measurements in salt. Verslvis, S.; Lindner, E.N. (Battelle Project Management Division, Office of Nuclear Waste Isolation, 505 King Avenue, Columbus, Ohio 43201). *IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science;* **30**: No. 1, 561-564(Feb 1983).

The transfer of experience, theory, and instrumentation suitable for hard rock media has posed numerous problems which this paper will address. Foremost of these pertains to the time-dependent (creep) behavior of salt. The theoretical mechanism is elusive; creep laws formulated to predict this behavior represent the state of the art in regression analysis. Furthermore, long term experiments (1 year) that would be necessary to determine creep mechanism(s) are enormously expensive and tie-up test equipment. Second, tests for determining in situ stress are based on the theory of elasticity. However anelastic (non-recoverable) strains contribute a significant portion of the material behavior precluding back calculating in situ stresses. Another problem pertains to the rate-dependent behavior of salt. Loading and temperature gradients experienced in the laboratory are more severe than would be experienced in a repository. Significant differences in material behavior can be expected along with special problems with instrumentation.

44821 Viscoelastic-gravitational deformation by a rectangular thrust fault in a layered earth. Rundle, J.B. (Division 5541, Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Geophysical Research;* **87**: No. B9, 7787-7796(10 Sep 1982).

Previous papers in this series have been concerned with developing the numerical techniques required for the evaluation of vertical displacements which are the result of thrust faulting in a layered, elastic-gravitational earth model. This paper extends these methods to the calculation of fully time-dependent vertical surface deformation from a rectangular, dipping thrust fault in an elastic-gravitational layer over a viscoelastic-gravitational half space. The elastic-gravitational solutions are used together with the correspondence principle of linear viscoelasticity to give the solution in

the Laplace transform domain. The technique used here to invert the displacements into the time domain is the Prony series technique, wherein the transformed solution is fit to the transformed representation of a truncated series of decaying exponentials. Purely viscoelastic results obtained are checked against results found previously using a different inverse transform method, and agreement is excellent. A series of results are obtained for a rectangular, 30° dipping thrust fault in an elastic-gravitational layer over viscoelastic-gravitational half space. Time-dependent displacements are calculated out to 50 half space relaxation times tau/sub a/, or 100 Maxwell times 2tau/sub m/ = tau/sub a/. Significant effects due to gravity are shown to exist in the solutions as early as several tau/sub a/. The difference between the purely viscoelastic solution and the viscoelastic-gravitational solutions grows as time progresses. Typically, the solutions with gravity reach an equilibrium value after 10—20 relaxation times, when the purely viscoelastic solutions are still changing significantly. Additionally, the length scaling which was apparent in the purely viscoelastic problem breaks down in the viscoelastic-gravitational problem.

44822 **Strain behavior of a granite and a graywacke sandstone in tension.** Schock, R.N.; Louis, H. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Journal of Geophysical Research;* **87**: No. B9, 7817-7823(10 Sep 1982).

Westerly granite and Lance graywacke sandstone were deformed with one of the principal stresses tensile at the same time that the principal strains were monitored. Both rocks exhibited inelastic behavior prior to failure. Pronounced dilatancy and softening in shear took place in the granite. When Young's modulus varied, it did so continuously between compression and tensile stress states with no apparent discontinuity at zero axial stress, implying that cracks played the same role in tension as in compression. Failure was observed whenever the tensile stress exceeded a critical value, in agreement with predictions from Griffiths' failfure criterion. The sandstone exhibited approximately twice as much strain per unit stress change as the granite and showed evidence of grain-to-grain movement as well as crack closure, results consistent with comparisons determined earlier when all stresses are compressive.

44823 **In-situ behaviour of salt from closure of deep boreholes.** Mogharrebi, M.; Thoms, R.L. (Louisiana State Univ., Baton Rouge (USA)). pp 198-203 of Underground rock engineering. Montreal, Canada; CIM (1980). (CONF-800522—).

From 13. symposium on rock mechanics; Ontario, Canada (28 May 1980).

Boreholes were drilled to depths of approximately 5000 ft (1524 m) into two north Louisiana salt domes, Vacherie and Rayburn's, in March through May of 1978. Early data indicated differing closure behaviour for the two boreholes, and suggested in-situ conditions strongly affected closure of openings in Gulf Coast salt domes. Subsequent data and more complete analyses substantiate these inital findings.

5804 Geochemistry

REFER ALSO TO CITATION(S) 43357, 43359, 43972, 44749, 44819

64 PHYSICS RESEARCH

6401 Astrophysics And Cosmology

REFER ALSO TO CITATION(S) 44911

44824 (INIS-SU—135, pp 35-39) **Sputtering in astrophysics and planetary science.** Tombrello, T.A. (California Inst. of Tech., Pasadena (USA). W.K. Kellogg Radiation Lab.). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Sputtering and related phenomena are discussed in relation to several examples from astrophysics and planetary science. The destruction of interstellar grains and the erosion of planetary surfaces and atmospheres by the solar wind are considered.

44825 **(MPE—177) Accreting neutron stars.** Brinkmann, W.; Truemper, J. (eds.). (Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.). Inst. fuer Extraterrestrische Physik). Oct 1982. 352p. (CONF-820748—). NTIS (US Sales Only), PC A16/MF A01. Order Number DE83780866.

From Workshop on accreting neutron stars; Munchen, F.R. Germany (18 Jul 1982).

Abstracts of individual items from the workshop were prepared separately for the data base. (GHT)

44826 **(MPI-PAE/EXTRATERR—169) Observations of fast, transient gamma-ray phenomena.** Kouveliotou, C. (Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.). Inst. fuer Extraterrestrische Physik). Sep 1981. 202p. NTIS (US Sales Only), PC A10/MF A01. Order Number DE83750901.

The present work is devoted primarily to the study of the solar GRBs as seen by the ISEE-3 satellite, in the energy range between 100 keV and 6.5 MeV. We have also included the cosmic GRB observations from ISEE-3, as a direct comparison for the two phenomena. Thus this thesis comprises 7 chapters: introduction, a chapter providing information on the instruments used, a discussion on the physics of the gamma-ray emission, a chapter describing the cosmic GRBs, and a chapter analysing the solar ones. Finally, we give the conclusions and a summary of our results and indications for the future observations.

44827 **(UM-P—82/50) Charged particle reaction cross sections and nucleosynthesis.** Sargood, D.G. (Melbourne Univ., Parkville (Australia). School of Physics). 1982. 113p. NTIS (US Sales Only), PC A06/MF A01. Order Number DE83701064.

The role of proton and α-particle induced reactions in carbon, neon, oxygen and silicon burning in massive stars is surveyed. The problems associated with determining thermonuclear reaction rates for reactions with widely spaced resonances and with closely spaced or overlapping resonances are discussed and the associated experimental approaches are reviewed. Experimental techniques which have been used in the measurement of reaction cross sections are discussed and their strengths and weaknesses are identified. Recent developments in attempts to establish reliable statistical-model codes for calculation of reaction cross sections are presented and discussed. The results of experimental tests of statistical model codes are summarised and evaluated.

44828 **Discovery of nonradial instability strips for hot, evolved stars.** Starrfield, S.G.; Cox, A.N.; Hodson, S.W.; Pesnell, W.D. (Theoretical Division, Los Alamos National Laboratory, NM). *Astrophysical Journal, Letters to the Editor;* **268**: No. 1, L27-L32(1 May 1983).

We have performed radial and nonradial, linear, nonadiabatic pulsation analyses of model stellar envelopes in the effective temperature range from 8 x 10^4 K to 1.5 x 10^5 K. These models have total masses of 0.6 M/sub sun/ and radii chosen so that they line up along a pre-white dwarf cooling curve computed by Schoenberner. We use three different interior compositions: (1) 100% carbon: (2) 50% ^{12}C and 50% ^{16}O (by mass); and (3) 10% ^{12}C and 90% ^{16}O (by mass). We find nonradial and radial instability strips for each composition caused by the partial ionization of carbon or oxygen or both. Our objective is to find the cause of the observed pulsations of PG 1159-035, a hot, evolved star with T/sub e/> or $=10^5$ K. While this star may be too hot to lie within any of our new instability strips, the closest agreement comes from models with significant amounts of ^{16}O near the stellar surface. If correct, this result implies that helium burning in envolved stars produces much more ^{16}O than heretofore believed.

44829 Massive, degenerate neutrinos and cosmology. Freese, K.; Kolb, E.W.; Turner, M.S. (Astronomy and Astrophysics Center, The University of Chicago, Chicago, Illinois 60637). *Physical Review [Section] D: Particles and Fields;* **27**: No. 8, 1689-1695(15 Apr 1983).

Modifications to the standard big-bang neutrino cosmology resulting from a nonzero chemical potential are discussed. Cosmological neutrino mass limits as a function of μ/T are derived. Implications for galaxy formation in a universe with degenerate neutrinos are emphasized.

44830 Multiple muons in the Homestake underground detector. Cherry, M.L.; Deakyne, M.; Lande, K.; Lee, C.K.; Steinberg, R.I.; Cleveland, B.; Fenyves, E.J. (Department of Physics, University of Pennsylvania, Philadelphia, Pennsylvania 19104). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1444-1447(1 Apr 1983).

The 113-m^2 water Cherenkov detector at a depth of 1480 m (4200 m water equivalent) in the Homestake Gold Mine, Lead, South Dakota, has been used to study multiple muons with E/sub $\mu/>$ or $\approx$2.7 TeV produced in cosmic-ray interactions by primaries of 10^{14}—10^{16} eV/nucleon. The decoherence curve and multiple-muon rates are presented.

44831 Early universe and high-energy physics. Schramm, D.N. (Department of Astronomy and Astrophysics at the University of Chicago, Chicago, Illinois). *Physics Today;* **36**: No. 4, 27-34(Apr 1983).

Many properties of the new particle field theories can only be tested by comparing their predictions about the physical conditions immediately after the Big Bang with what we can reconstruct about this event from astronomical data.

44832 Bubbles, jets, and clouds in active galactic nuclei. Smith, M.D.; Smarr, L.; Norman, M.L.; Wilson, J.R. (Department of Physics, University of Illinois at Urbana-Champaign). *Astrophysical Journal;* **264**: No. 2, 432-445(15 Jan 1983).

The Blandford and Reese 1974 fluid twin-exhaust model for jet formation is thoroughly investigated. We perform detailed analytic calculations of all aspects of the cavity-nozzle structures for the nonrelativistic case: the preshock flow, the central shock, cavity flow, and the nozzle. Our analytic results are in excellent agreement with recent sophisticated numerical calculations. We find that for a given central confining gas cloud, only a finite range of jet powers is possible. The sound speed ratio between cavity and cloud must be less than 30. Central masses of $\sim 10^9$ M/sub sun/ within 1 pc are necessary for high-powered (10^{46} ergs s^{-1}) extragalactic jets. For a fixed confining cloud sound speed C_0, there are three regimes determined by the central engine's luminosity. For low luminosity, a stream of bubbles emerges; for a middle range of luminosities, a jet forms; for too high a luminosity, large clouds are emitted. In the jet regime we find that L/sub j/$\sim C^0_s$. The critical dependence of jet power on confining cloud sound speed enables a schematic picture for active galactic nuclei to be proposed. Seyfert galaxies and quasars are placed in the bubble regime. Variable compact radio sources reach the cloud regime. Evolutionary paths are suggested and may provide an indirect test for this picture.

6402 Atmospheric Physics

44833 Stability of electron distributions within the earth's bow shock. Thomsen, M.F.; Barr, H.C.; Gary, S.P.; Feldman, W.C.; Cole, T.E. (Earth and Space Science, Division Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Geophysical Research;* **88**: No. A4, 3035-3045(1 Apr 1983).

The linear Vlasov stability of a class of electron velocity distributions which model those observed within the earth's bow shock is examined. The study is restricted to electrostatic waves which propagate parallel to the ambient magnetic field B. Two instabilities are identified which are driven by free energy in the direction parallel to B: an ion acoustic wave with real frequency below the ion plasma frequency and an electron acoustic wave with real frequency of several times the ion plasma frequency. The characteristics of the unstable waves are in accord with observations obtained within the bow shock, in particular, with the trend of the observed electrostatic waves to be polarized parallel to the magnetic field. The instabilities identified here may contribute to electron dissipation in collisionless shocks.

44834 Electron velocity distributions near the earth's bow shock. Feldman, W.C.; Anderson, R.C.; Bame, S.J.; Gary, S.P.; Gosling, J.T.; McComas, D.J.; Thomsen, M.F.; Paschmann, G.; Hoppe, M.M. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Journal of Geophysical Research;* **88**: No. A1, 96-110(1 Jan 1983).

A survey of two-dimensional electron velocity distributions, f(V), measured near the earth's bow shock using Los Alamos/Garching plasma instrumentation aboard ISEE 2 is presented. This survey provides clues to the mechanisms of electron thermalization within the shock and the relaxation of both the upsteam and downstream velocity distributions. First, near the foreshock boundary, fluxes of electrons having a power law shape at high energies backstream from the shock. Second, within the shock, cuts through f(V) along B. f(V), often show single maxima offset toward the magnetosheath by speeds comparable to, but larger than, the upstream thermal speed.Third, magnetosheath distributions generally have flat tops out to an energy, E_0, with maxima substantially lower than that in the solar wind. Occasionally, cuts through f(V) along B show one and sometimes two small peaks at the edge of the flat tops making them appear concave upward. The electron distributions characteristic of these three regions are interpreted as arising from the effects of macroscopic (scale size comparable to or larger than the shock width) electric and magnetic fields and the subsequent effects of microscopic (scale size small in comparison with the shock width) fields. In particular, our results suggest that field-aligned instabilities are likely to be present in the earth's bow shock.

6403 Atomic, Molecular, And Chemical Physics

REFER ALSO TO CITATION(S) 44146, 44157, 44266, 44279, 44307

44835 (ARL/TR—050) Annual review of research projects 1981. Keam, D.W. (ed.). (Australian Radiation Lab., Melbourne). Jan 1983. 156p. NTIS (US Sales Only), PC A08/MF A01. Order Number DE83780995.

Abstracts of individual items from the review were prepared separately for the data base. (GHT)

44836 (CEA-CONF—6590) X ray emission experiments at 1.06 μm and 0.35 μm. Babonneau, D.; Billon, D.; Bocher, J.L.; Di Bona, G.; Fortin, X.; Thiell, G. (CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)). Oct 1982. 22p. (CONF-821089—13). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703392.

From 6. international workshop on laser interaction and related plasma phenomena; Monterey, CA, USA (25 Oct 1982).

Experiments and analyses on high-Z targets X-ray emission are reported. Two kinds of targets have been used: spherical targets with Octal laser (1.06 μm; 10^{13} to 10^{15} W/cm^2) and planar targets with P102 laser (0.35μm; 3 x 10^{13} to 3 x 10^{14} W/cm^2). The influence of the different parameters (laser flux, laser wavelength, atomic number) on emission rates and spectra is discussed. The results about the emission rates are compared with data from other laboratories and an experimental scaling law is proposed. Temperatures can be evaluated from experimental spectra and related to the different plasma regions. Space-time resolved measurements with a streak camera, from spherical targets, in the (1 - 1.3 keV) energy range allow to determine a velocity: about 6 x 10^6 cm/s for the emission region.

44837 (CONF-8206205—1) Radiative decay of surface plasmons on nonspherical silver particles. Little, J.W.; Ferrell, T.L.; Callcott, T.A.; Arakawa, E.T. (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 12p. NTIS, PC A02/MF A01. Order Number DE83014007.

From Workshop on physics of submicron structures; Urbana, IL, USA (28 Jun 1982).

We have studied the radiation emitted by electron-bombarded silver particles. Electron micrographs have shown that the particles, obtained by heating thin (5 nm) silver films, were oblate (flattened) with minor axes aligned along the substrate normal. The characteristic wavelength obtained by bombarding these particles with 15-keV electrons was found to vary with angle of photon emission. We have modeled this wavelength shift as a result of the mixture of radiation from dipole and quadrupole surface-plasmon oscillations on oblate spheroids. Experimental observations of the energy, polarization, and angular distribution of the emitted radiation are in good agreement with theoretical calculations.

44838 (DOE/ER/06036—T1) **X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983.** Watson, R.L. (Texas A and M Univ., College Station (USA). Cyclotron Inst.). Mar 1983. Contract AS05-78ER06036. 105p. NTIS, PC A06/MF A01. Order Number DE83008776.

Portions are illegible in microfiche products.

A major project involving the study of electron transfer in fluorine compounds following multiple K-plus L-shell ionization by 5.5 MeV He, 22 MeV C, 48 MeV Mg, and 80 MeV Ar ions was completed. This comprehensive investigation, which began three years ago, uncovered a resonant electron transfer mechanism, provided the first quantitative estimates of electron transfer rates, and revealed the importance of fast electron transfer to $n \geqq 3$ states in solid compounds. Considerable progress was made in delineating the effects of solid state environment on x-ray emission from highly stripped projectile ions. A surprising result in this project area was the discovery of lines associated with states involving $n = 3$ electrons in 48 MeV Mg projectile x-ray spectra obtained with thick carbon targets. Work was completed on a study of the alignment of foil-excited H- and He-like states in 65 MeV sulfur ions. These measurements are being extended to Magnesium ions with the intention of searching for surface and tilted foil effects. The report contains a summary of the research activities supported by this contract during the 1981 to 1982 contract year.

44839 (FIAS-R—106) **Valence electron momentum distributions in cadmium.** Frost, L.; Weigold, E.; Mitroy, J. (Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies). Aug 1982. 18p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701057.

The valence 5s and 4d electron momentum distributions in cadmium have been measured using noncoplanar symmetric (e, 2e) electron coincidence spectroscopy at a total energy of 1200eV. They are in close agreement with Hartree-Fock momentum distributions both in shape and relative magnitudes. Some satellite lines of very low intensity have been detected. A CI calculation of the Cd ground state and several Cd^+ ion states has been carried out to predict cross reactions for the ground state and various satellite transitions. The predictions are in agreement with the data.

44840 (GSI—82-8, pp 318-324) **Low energy charge changing cross sections.** Salzborn, E. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The author gives a review about some experimental measurement of the cross sections for electron capture and ionization in ion-ion collisions.

44841 (GSI—82-8, pp 543-570) **Ions stopping in dense and hot matter.** Deutsch, C.; Maynard, G.; Minoo, H. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

We consider a complete and numerically exact solution for the energy loss and straggling of swift nonrelativistic ions in a very dense electron fluid of arbitrary degeneracy and for any ion-velocity Fermi-velocity ratio.

44842 (GSI—82-8, pp 571-577) **Ab initio calculations of the charge state of a fast heavy ion stopping in a finite temperature target.** Bailey, D.; Lee, Y.T.; More, R.M. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

We present a calculation of the time dependent charge state of a heavy projectile traversing a finite temperature target. The calculation uses an average-atom model to integrate the rate equations.

44843 (INIS-SU—135, pp 197-198) **Cross section of elastic scattering of ions on atoms.** Gartner, K.; Hehl, K. (Friedrich-Schiller-Universitaet, Jena (German Democratic Republic)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

44844 (INIS-SU—135, pp 8-12) **Atom collision processes in sputtering.** Thompson, M.W.; Farmery, B.W. (Sussex Univ., Brighton (UK). School of Mathematical and Physical Sciences); Reid, I.H. (Queen's Univ., Kingston, Ontario (Canada)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The investigation of atom collision processes in Au crystal target bombarded with 20 keV Ar^+ ions has been carried out. A time-of-flight spectrometer has been used modified in two important respects: firstly the axis of emission is varied from the angle of 0=45 deg (with respect to the incident beam absolute value of energy distribution may be determined from the total radioactivity of the sputtered atoms and total charge of ions on the target. The results of investigation are presented in the form of time-of-flight spectra. The contributions of primary recoils after a collision and after focused collision sequences into time-of-flight spectra and also the discrimination of the contributions by careful choice of the experimental conditions are discussed.

44845 (INIS-SU—135, pp 39-41) **Sputtering of titanium and its alloys by 1 to 6 keV He ions.** Gusev, K.I.; Mikheev, S.Yu.; Ryzhov, Yu.A.; Strizhenov, D.S.; Shkarban, I.I. (Moskovskij Aviatsionnyj Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Sputtering coefficients S of titanium and titanum base alloys have been investigated by means of 1-6 keV helium ions. A technique based on the precipitation of a sputtered component on the surface of a quartz resonator was used to investigate the sputtering coefficients. The yield indicatrix of sputtered particles for He^+ - titanium alloy pair at 5 keV energy of incident ions is presented. Dependence of a relative value of S on the bombardment time at 3 keV energy of incident ions for alloys has been calculated. It is shown that steady values of the relative value of S are independent of the ion current density.

44846 (INIS-SU—135, pp 50-52) **Sputtering yields for two-phase Ag-Cu thin film alloys.** Betz, G.; Farber, W.; Braun, P. (Vienna Univ. (Austria)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Sputtering of two-phase alloys has been studied. It has been found that the surface composition is changed due to preferential sputtering and also the sputtering yield has no obvious relationship to the sputtering rates of the pure constituents. Thin films (about 500 nm thick) of Ag-Cu alloys of various compositions and of the pure constituents have been deposited by electron beam evaporation on glass or on electroplated Ta_2O_5 film. The samples have been sputtered with 2 keV Ar^+ ions under normal incidence and simultaneously analyzed by the Auger electron spectroscopy. It has

been found that the alloy sputtering rate remains close to that of pure Cu up to about 70 atom % of Ag.

44847 (INIS-SU—135, pp 52-54) **Velocity measurements of neutral sputtered particles by means of a Doppler shift laser spectrometer.** Husinsky, W.; Bruckmuller, R.; Blum, P. (Technische Univ., Vienna (Austria). Inst. fuer Allgemeine Physik). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

44848 (INIS-SU—135, pp 55-56) **Comparative studies of the energy distribution of neutral atoms sputtered from a NiW-alloy and from elemental Ni and W by 2.5 keV Ar^+ ions.** Oechsner, H.; Bartella, J. (Technische Univ. Darmstadt (Germany, F.R.). 1. Physikalisches Inst.). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Combined energy and mass analysis of postionized sputtered neutrals is used to determine the energy spectra of Ni and W atoms ejected from a Ni 88% - W 12% alloy and from pure Ni and W targets by normally incident Ar^+ ions of 2.5 keV. Informations are derived on the spectral flux densities of the atomic collision cascades within the solid, and on the surface binding energies of the alloy.

44849 (INIS-SU—135, pp 57-58) **Investigation of the angular distributions of the sputtered atoms of gold monocrystals.** Lebedev, S.Ya.; Lysova, G.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Angular distributions of sputtered atoms of gold monocrystals have been investigated. The plane (110) of a gold monocrystal was bombarded with one-charged ions of argon, molecular and monatomic nitrogen of 70 keV energy. The autoradiographic technique was used to measure the space distribution of the sputtered atoms of a target. Radiographic prints corresponding to the angular distribution of sputtered substance on a collector have been produced. The distribution of the optical density of autoradiograms in spots near the directions of the type <110> constituting different angles with the direction of the ion beam, was measured in two directions mutually perpendicular: along traces of planes of the (100) and (110) types. Ratios of angular semiwidths of the spots measured along these plane traces are presented.

44850 (INIS-SU—135, pp 59-64) **Variation of spot intensity in monocrystal ejection patterns as a function of the ion incidence.** MacDonald, R.J.; Parish, B.; O'Connor, D.J. (Australian National Univ., Canberra. Dept. of Physics:. 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The ejection patterns resulting from 43 keV Ar^+ ion bombardment of the (100) surface of Au have been studied as a function of the angle of ion incidence. The target has been rotated about a <100> axis in the plane of the surface and about an axis lying at 23 deg to this <100> direction in the plane of the surface. The results have been considered in terms of the transparency model but the experimental results cannot be explained by this model. The results suggest that the focuson contribution to the ejection pattern is minimal, and that ejection pattern studies of this sort cannot be used to obtain experimental values for focuson and displacement energies.

44851 (INIS-SU—135, pp 82-83) **Influence of surface microstructure on cathode sputtering of metals in the near threshold energy range.** Askerov, Sh.G.; Hasrullaev, D.M. (Azerbajdzhanskij Gosudarstvennyj Univ., Baku (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

44852 (INIS-SU—135, pp 98-100) **Charge state of hydrogen backscattered from a gold monocrystal.** Matschke, F.E.P.; Eckstein, W.; Verbeek, H. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Experimental study of charge state of hydrogen backscattered from a gold monocrystal has been carried out. Experimental distributions are presented along with their qualitative interpretation.

44853 (INIS-SU—135, pp 101-102) **Energy spectra and charge states for H and He backscattered from Si in the energy range of 1.5-10 keV.** Robinson, J.E.; Agamy, S.A. (McMaster Univ., Hamilton, Ontario (Canada). Inst. for Materials Research). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Experimental measurements and calculations for the energy distributions of H and He ions and neutral atoms backscattered at 135 deg from a silicon target are presented. Energy spectra have been recorded for atoms (H, He) and molecules (H_2, H_3) over the incident energy range of 2-15 keV. Backscattered particles have been measured and compared to a computer simulation, which uses a Thomas-Fermi cross section. Good qualitative agreement has been found between the calculations and experimental spectra.

44854 (INIS-SU—135, pp 103) **Energy spectra of neutral particles measured with the time-of-flight and the stripping techniques.** Luitjens, S.B.; Boers, A.L. (Rijksuniversiteit Groningen (Netherlands). Inst. voor Theoretische Natuurkunde). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

44855 (INIS-SU—135, pp 106-108) **Energy and charge distributions in scattered particle flux under 5-60 keV hydrogen ion bombardment of copper target.** Ajnetdinov, E.B.; Zhabrev, G.I.; Kurnaev, V.A.; Tel'kovskij, V.G. (Moskovskij Inzhenerno-Fizicheskij Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Regularities of reflection and change of charge state by interaction of medium energy ions with copper target surface were investigated. Energy spectra for different scattering angles (12 deg, 60 deg, 80 deg, 100 deg) and different initial energies (E_0=10, 30, 50 keV) have been obtained. Dependence of spectra parameters on an angle of slide has been studied. Results of an approximate share of neutral atoms in a beam and relation of charged components at fixed angles of slide and scattering are given. Probability of particle scattering in the form of positive ions has been calculated. Compared are obtained energy spectra of total-in-charge flux of scattered particles and theories of multiple scattering for scattering potentials of the r^{-1} and r^{-2} kinds as well as the model of single scattering.

44856 (INIS-SU—135, pp 112-115) **Surface scattering of MeV He^+ ions from W(100) and Si(100) monocrystals.** Feldman, L.C.; Kauffman, R.L.; Silverman, P.J.; Stensgaard, I. (Bell Labs., Murray Hill, NJ (USA)); Zuhr, R.A. (New York Univ., NY (USA)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The surface high-energy peak in the energy spectrum, observed in He^+ backscattering experiments has been studied. Calculation methods and various approximations are considered. Meas-

urements for W(100) and Si(100), bombarded by MeV He^+ ions, are presented. The obtained experimental data are compared to calculation results. The difference between experiment and theory allows to derive a number. of conclusions about the structure and dynamics of the surfaces studied. The comparison between the surface peak intensities of the Si surface and surfaces with thin SiO_2 layers is carried out. From experimental measurements the conclusion is made that SiO_2 layer is stoichiometric within approximately 3A of the interface.

44857 (INIS-SU—135, pp 119-123) **Scattering and sputtering under bombardment of a monocrystal by a gliding ion beam.** Shelyakin, L.B.; Schaarschmidt, G.; Yurasova, V.E. (Moskovskij Gosudarstvennyj Univ. (USSR)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Patters of deposits on a collector under Cu monocrystal bombardment by a gliding $^{40}Ar^+$ ion beam generated in a mass separator have been used to study not only sputtering but also ion scattering. The ion beam was incident on the (001) face at an angle chemical bond=15 deg. The method used has made it possible to study the ion scattering in a broad angular range. Attention has been drawn to the existence of several regions of predominant scattering in the form of spots. The role of forbidden planes of scattering was explicitly demonstrated.

44858 (INIS-SU—135, pp 124-127) **Some analytical solutions to the two atom blocking model.** Oen, O.S. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The two atom blocking model with thermal displacements has been reinvestigated and some new analytical results have been found. For Coulomb scattering, an exact solution for the blocking pattern is found which depends on only two parameters. For scattering from a Moliere potential, a similar parameterization produces a nearly universal set of curves. The results should be useful in analyzing data of ion backscattering experiments that measure crystal surface relaxation.

44859 (INIS-SU—135, pp 128-131) **Angular distribution of ions scattered by monocrystal surface semichannels.** Shulga, V.I. (Moskovskij Gosudarstvennyj Univ. (USSR). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The angular distribution of ions scattered by monocrystal surface semichannels is obtained using the impulse approximation. The computation is carried out in the case when ions reflected from the row of second-layer atoms pass between two rows of first-layer atoms. The calculated results are compared with experimental distributions obtained for 10-35 keV Ar^+ ions scattered from the Cu(001) surface.

44860 (INIS-SU—135, pp 132-135) **Computer simulation of the grazing incidence backscattering of protons from a (110) nickel surface.** Hou, M. (Brussels Univ. (Belgium)); Robinson, M.T. (Oak Ridge National Lab., TN (USA)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The computer program MARLOWE has been used to study the processes whereby protrons are reflected from the (110) surface of a nickel crystal. The ions were incident in the (001) plane, at an angle of 7.5 degrees from the surface. Energy and angular distributions of the backscattered particles were investigated for the incident energy range 0.1 to 5 keV. The results were compared with similar ones for an amorphous target. Total reflection of the beam occurred below 1.2 keV. Focusing in the [110] semichannels was found to be energy dependent and to be strongest under total reflection conditions. The energy distributions of the reflected particles showed a complex structure which is dependent on the incident energy. This structure is interpreted in terms of detailed reflection mechanisms.

44861 (INIS-SU—135, pp 141-142) **Influence of stopping power on the reflection coefficients of hydrogen ions from stainless steel.** Jackson, D.P. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.); Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

A computer simulation model was used to investigate the reflection coefficients of hydrogen ions from amorphous stainless steel (γ-iron) in the energy range from 100 eV to 12.5 keV. Good agreement was obtained between the calculations and recent experimental measurements. At 100 eV the calculated reflection coefficients were relatively insensitive to the electron stopping power. At higher energies the reflection coefficients were found to vary inversely with electron stopping power.

44862 (INIS-SU—135, pp 143-148) **Photon emission from ion bombarded solids.** MacDonald, R.J. (Australian National Univ., Canberra. Dept. of Physics:. 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Some new results describing the spectral distribution of intensity of the line emission from ion bombarded targets are presented. The photon intensity distribution from both elemental and the components of alloy targets are shown to suggest a state of local thermodynamic equilibrium in the irradiated area. Such a situation is shown to be consistent with electron excitation in the solid. The results do not agree with spike model. For some targets non-radiative processes play a big part in determining the spectral distribution of intensity. Measurements have been carried out for NBS stainless steel samples, bombarded with 45 keV Ar^+ ions.

44863 (INIS-SU—135, pp 149-150) **Secondary ion emission from concentrated alloys and compounds.** Cherepin, V.T.; Vasil'ev, M.A. (AN Ukrainskoj SSR, Kiev. Inst. Metallofiziki:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Concentration and some structural dependences of concentrated alloys and compounds were investigated on the basis of measurement of the secondary ion emission coefficient, ion yield, ionization degree and sputtering coefficient. Targets were made of binary alloys and compounds. The measurements were performed bombarding the targets with 8 keV Ar ions. The most important and general obtained regularities of the secondary ion emission are firstly significant difference in ion yield for a number of alloys and compounds as compared with initial components and secondly inverse dependence of the ionization degree and the sputtering coefficient on the composition or structural changes. Main experimental results obtained are satisfactorily explained on the basis of the sputtering model and the mechanism of the secondary ion emission.

44864 (INIS-SU—135, pp 155-156) **Quantum theory of the emission of secondary ions from metal surfaces.** Antal, J. (Budapesti Mueszaki Egyetem (Hungary). Fizika Tanszek). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Emission process of secondary ions from metal surfaces is analyzed in the framework of a quantum mechanical model. Clean metal surfaces and simple pure ideal metal crystals are assumed. Calculations have been carried out for 17 different metals. Results of simple approximation, comparison with experimental data and with alternative theoretical calculations are presented.

44865 (INIS-SU—135, pp 158-161) **Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal.** Ayukhanov, A.H.; Abdullaeva, M.K.; Turmashev, E. (AN Uzbekskoj SSR, Tashkent. Inst. Ehlektroniki:. 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Negative-ion sputtering coefficients for 5 metals (copper, silver, iron, nickel and molybdenum) under bombardment by Cs ions with energies of 500-3000 eV in the regime of alkali-metal film deposition on the surface being bombarded have been determined. The ionization coefficients while of Si, Cu, Ni, Ag, C, Ge, Au and Pt target sputtering have also been measured.

44866 (INIS-SU—135, pp 161-162) **Orientational dependence od secondary ion emission in the direction of close packing.** Bukhanov, V.M.; Motavekh, Kh.A. (Moskovskij Gosudarstvennyj Univ. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Secondary ion emission of a copper monocrystal irradiated with 10-40 keV Ar^+ ions has been investigated. Dependence of current of secondary positive ions emitted in one of dense-packed directions [101] on an incidence angle of bombarding ions to the Cu face (001) in the plane (110) has been determined. The non-monotonous character of the angular dependence of the secondary ion emission has been established. Possibility for using the angular dependence to determine the width of open channels and critical energy of channeling has been shown. An effective depth of the secondary ion emission for several values of bombarding ion energy has been evaluated.

44867 (INIS-SU—135, pp 166-169) **Some aspects of the secondary ion emission from metals.** Adylov, A.A.; Veksler, V.I.; Tsipinyuk, B.A. (Tashkentskij Gosudarstvennyj Univ. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Two classes of experiments on the determination of an ionization mechanism of sputtered atoms have been performed. Threshold energy of secondary ion emission when bombarding a number of metals with Cs^+ ions have been investigated in the first class. The obtained threshold energies have been compared with corresponding thresholds of cathode sputtering. In the second class of the experiments investigated was the change in energy spectra of knocked-out ions of Nb^+ and Mo^+ when changing Hg^+ ion energy bombarding the corresponding polycrystalline targets. Incident ion energy varied in the range from 250 to 2000 eV. It follows from the analysis of the results obtained that the ion production during the sputtering is determined with the electron-exchange mechanism of the secondary ion emission.

44868 (INIS-SU—135, pp 170-172) **Periodical dependence of physical parameters defining the yield of sputtered ions.** Jurela, Z. (Institut za Nuklearne Nauke Boris Kidric, Belgrade (Yugoslavia)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Physical parameters defining the yield of sputtered ions for all elements of Periodic System which at normal conditions are in solid state are studied. The emission of sputtered ions is especially influenced by surface work function, ionization potential and electron affinity of sputtered particles. Periodical dependence of these parameters on atomic number Z is considered. Validity of experimental data on the parameters in question is estimated. The physical implications of observed dependences are discussed.

44869 (INIS-SU—135, pp 172-174) **Some general regularities of secondary ion emission form organic substances.** Tantsyrev, G.D. (AN SSSR, Moscow. Inst. Khimicheskoj Fiziki:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Secondary ion emission from organic substances differing in the elementary composition, molecule structure and molecular weight has been investigated. The target bombardment was predominantly performed with 200-3000 eV atom beams of noble gases (He, Ar, Xe). A production mechanism for secondary ions from organic substances has been suggested on the basis of the experimental data. Good correspondence of the suggested mechanism and experimental results has been shown.

44870 (INIS-SU—135, pp 175-177) **Auger electrons in the energy spectra of ion-electron emission.** Dorozhkin, A.A.; Petrov, A.A.; Petrov, N.N. (Leningradskij Proektnyi Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Comparative study on energy spectra of secondary electrons when irradiating a series of metals and semiconductors (Ni, Cu, Mo, Ta, Si, Ga, As) with ions of different kinds (He^+, Li^+, N^+, K^+, Ar^+, Ar^{++}) with energies from 2 to 15 keV have been performed. It is found that at ion energy above 6-7 keV in the secondary electron spectra observed are the Auger peaks, which position does not change during further increase of primary particle energy. Comparison of the Auger electron spectra generated with different ions shows that the structure of spectra for the given target is considerably different. Appearance of the Auger peaks characteristic of one or another elements in the first approximation may be. predicted on the basis of correlation diagrams introduced with Lichten, Fano and Barat.

44871 (INIS-SU—135, pp 188-191) **Electron emission from metal-film systems under atomic particle bombardment.** Ortykov, A.; Rakhimov, R. (AN Uzbekskoj SSR, Tashkent. Inst. Ehlektroniki:. 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Processes of potential and kinetic electron emission of film systems (Cs, Na and Ba on the Mo substrate) depending on emitter properties have been considered. Measurements of emission coefficients and energy spectra of electrons when controlling the surface work function and its purity have been performed for the Na, Cs, Ba systems on the Mo substrate during the bombardment with 50 eV He^+, Ar^+ and Kr^+ ions. The results obtained have been discussed from the point of view of representations of electron- adsorption processes.

44872 (INIS-SU—135, pp 205-208) **Experimental and theoretical consideration of recoil implantation.** Fischer, G.; Colligon, J.S.; Hill, A.E. (Salford Univ. (UK). Dept. of Electrical Engineering). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

A novel technique of recoil implantation for producing implants in a very wide concentration range is proposed. The current atomic collision theory is adapted to allow the calculation of depth distribution profiles of the recoil atoms. A relatively inexpensive recoil implantation device has been shown to have the desired parameters for maintaining a constant film thickness on a substrate. An equation for concentration probability profile has been obtained.

44873 (INIS-SU—135, pp 327-330) **Sputtering and stoichiometric changes by bombardment of Ta_2O_5 with keV light ions.** Seefeld, H.; Behrisch, R.; Scherzer, B.M.U.; Staib, P.; Schmidl, H. (Max-Planck-Institut fuer Plasmaphysik, Garching (Germany, F.R.)). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

An investigation of the sputtering yields and the surface composition changes of tantalum oxide films (Ta_2O_5) due to bombardment with 1-20 keV H+ D+ He and Ne ions has been carried out. The sputtered targets have been analysed by Rutherford backs-

cattering and by Auger spectroscopy. The results of the investigation show that sputtering yields of Ta_2O_5 with light ions are comparable to yields obtained for pure metals. A depletion of oxyden in a layer which thickness is roughly equal to the mean projected range of the ions is observed.

44874 (INIS-SU—135, pp 330-337) **Ion bombardment induced evolution of inert gases trapped in solids.** Donnelly, S.E.; Webb, R.; Armour, D.G.; Carter, G. (Salford Univ. (UK). Dept. of Electrical Engineering). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Some studied have shown that ion bombardment of a solid containing preimplanted gas atoms leads to significant gas release. In this paper process of argon release from nickel monocrystal by post implant bombardment with helium, neon, krypton ions has been investigated. A theoretical model has been deed in which release is accounted for by inclusion of both dynamic collision effects and postcascade thermal spikes in the description of the total gas sputtering cross section. By fitting the results obtained using this model to the experimentally measured values the self gas sputtering cross section for argon has been determined.

44875 (INIS-SU—135, pp 215-218) **Multiple scattering of 57 keV ^{29}P in Si.** Latta, B.M.; MacArthur, J.D.; Scanlon, P.J. (Queen's Univ., Kingston, Ontario (Canada). Dept. of Physics). 1980. NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

Results of experimental study of ^{29}P multiple scattering in Si are presented. ^{29}P with kinetic energy of 57 keV has been produced by capture of 1.65 MeV protons in thin layers of Si. The scattered ^{29}P has been collected on annular catcher foils and relative amount of ^{29}P on each foil has been determined by measuring its beta-activity. Multiple scattering distributions obtained in the experiment are compared with theoretical calculations. Possible causes of observed discrepancies are discussed.

44876 (INIS-SU—147, pp vp) **Materials sputtering by fission fragments.** Baranov, I.A.; Obnorskij, V.V. (Radievyj Inst., Leningrad (USSR)). 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Experimental results on sputtering of different materials by heavy multiply-charged ions (fission fragments) are discussed. The data desribing sputtering coefficients as a function of different parameters as well as certain characteristics of the sputtered material are presented. It is noted, when specific ionization losses of heavy multiply-charged ions are > or approximately $1.3x10^4$ eV/nm, two types of sputtering are supposed to take place. One type is found in the case of fine-grained materials with grain size < or approximately 20 nm; it is characterized by large K (10^3-10^4 at./fragm.) and mainly due to inelastic interactions of fission fragments with atoms of the material. The other type of sputtering is found for metals with larger grains (diameter > or approximately 50 nm) and nonconducting materials and characterized by relatively low K (5-50 at./fragm.); the relation and role of elastic and inelastic interactions of fission fragments with atoms of the substance in sputtering are still to be explained.

44877 (INIS-SU—147, pp vp) **Positron diffusion in porous materials.** Bolotov, V.N.; Slezov, V.V. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Diffusion of thermalized positrons in porous materials is discussed. The analytic expression is obtained for a longlived component of the lifetime. Criterion of applicability of the theory is given. Using the diffusion equation the expression for a probability of positron capture by a spherical void as a function of time is obtained.

44878 **(INS-NUMA—28) Proceedings of symposium on inertial fusion with heavy ion beam.** (Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study). Apr 1981. 127p. (CONF-8010330—). NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780993.

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

Abstracts of individual items from the symposium were prepared separately for the data base. (GHT)

44879 **(KFK—3344) Laser induced fluorescence spectroscopy in atomic beams of radioactive nuclides.** Rebel, H.; Schatz, G. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Zyklotronlaboratorium). 1982. 34p. (CONF-820428—10). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83750201.

From Conference on lasers in nuclear physics; Oak Ridge, TN, USA (21 Apr 1982).

Measurements of the resonant scattering of light from CW tunable dye lasers, by a well collimated atomic beam, enable hyperfine splittings and optical isotope shifts to be determined with high precision and high sensitivity. Recent off-line atomic beam experiments with minute samples, comprising measurements with stable and unstable Ba, Ca and Pb isotopes are reviewed. The experimental methods and the analysis of the data are discussed. Information on the variation of the rms charge radii and on electromagnetic moments of nuclei in long isotopic chains is presented.

44880 **(LBL—16241) Equilibrium charge states of uranium at relativistic energies.** Crawford, H.; Gould, H.; Greiner, D.; Lindstrom, P.; Symons, J. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 4p. (CONF-830675—3). NTIS, PC A02/MF A01. Order Number DE83014865.

From 6. high energy heavy ion study and 2. workshop on anomalons; Berkeley, CA, USA (28 Jun 1983).

We have measured the charge fractions of uranium ions at energies of 962 MeV/amu and 430 MeV/amu passing through various thickness targets of mylar ($Z \simeq 6.6$), Cu ($Z = 29$) and Ta ($Z = 73$). From these we determine the equilibrium charge state distributions.

44881 **Measurement of the relative populations of I($^2P^0$/sub 1/2/) and I($^2P^0$/sub 3/2/) by laser induced vacuum ultraviolet fluorescence.** Brewer, P.; Das, P.; Ondrey, G.S.; Bersohn, R. (Department of Chemistry, Columbia University, New York, New York 10027). *Journal of Chemical Physics;* **79**: No. 2, 720-723(15 Jul 1983).

The ground ($^2P^0$/sub 3/2/) and first excited ($^2P^0$/sub 1/2/) states of iodine atoms can absorb two photons at 304.7 and 306.7 nm, respectively, to reach $^2D^0$/sub 5/2/ and $^2D^0$/sub 3/2/ states. The excited atoms fluoresce twice, emitting an IR and then a VUV quantum. This is the basis of a new method for measuring the relative quantum yields of the two fine structure states at very short times after the atoms are formed. Quantum yields for I(production are reported for a number of alkyl halides and HI upon photodissociation.

44882 **Two photon laser induced fluorescence of carbon atoms.** Das, P.; Ondrey, G.; van Veen, N.; Bersohn, R. (Department of Chemistry, Columbia University, New York, New York 10027). *Journal of Chemical Physics;* **79**: No. 2, 724-726(15 Jul 1983).

Carbon atoms were generated by two photon absorption in carbon suboxide C_3O_2. Two photon laser induced fluorescence (LIF) excitation spectra using the 3 ^3D/sub J'←2 ^3P/sub J'' at 287 nm and 4 $^1P_1$←2 $^1D_2$ at 284 nm transitions were intense showing that LIF is a convenient detection method for carbon atoms in their ground ^3P and first excited ^1D states. Calculated values of the relative intensities of the seven allowed J'←J'' transitions were in good agreement with experimental values.

44883 CARS investigation of HBr and H_2 collisions with hot H atoms produced by ArF laser photolysis of HBr. Quick, C.R. Jr.; Moore, D.S. (University of California, Los Alamos National Laboratory, Chemistry Division, Los Alamos, New Mexico 87545). *Journal of Chemical Physics;* **79**: No. 2, 759-764(15 Jul 1983).

Coherent anti-Stokes Raman spectroscopy is used to examine the rotational and vibrational state distributions in HBr and H_2 molecules excited by collisions with translationally hot H atoms produced by ArF laser photolysis of HBr. CARS detection of Br atoms and of rovibrationally excited H_2 produced by the H+HBr reaction is demonstrated for the first time.

44884 Photoionization studies of Na_2Cl and Na_2O and reactions of metal clusters. Peterson, K.I.; Dao, P.D.; Castleman, A.W. Jr. (Department of Chemistry, 152 Davey Laboratory, The Pennsylvania State University, University Park, Pennsylvania 16802). *Journal of Chemical Physics;* **79**: No. 2, 777-783(15 Jul 1983).

Reaction between metal clusters and various reactant gases in a coexpanding nozzle led to the formation of Na_2Cl and Na_2O. These species were subjected to photoionization using a UV light source, monochromator, and mass spectrometer detection system. Appearance potentials of 95.7 and 116.7 kcal/mol were obtained for Na_2Cl and Na_2O, respectively. The appearance potential of the Na_2Cl lies between the ionization potential of the metal and the electron affinity of chlorine, while that of Na_2O is close to the ionization potential of the metal. Using these values and other literature data, energies were derived for the following bonds: Na—NaCl (19.7 kcal/mol), $Na^+{}_2xCl$ (115.5), Na_2xCl (98.9), and $Na^+{}_2xCl^-$ (127.8); Na^+xNaO (56.8), $Na^+{}_2xO$ (94.2), Na_2xO (98.6), and $Na^+{}_2xO^-$ (177.2).

44885 Infrared multiphoton dissociation of 1-chloro-1-fluoro ethylene: Competitive reactions and pressure dependence. Jalenak, W.A.; Nogar, N.S. (Department of Chemistry, University of Nebraska, Lincoln, Nebraska 68588). *Journal of Chemical Physics;* **79**: No. 2, 816-824(15 Jul 1983).

We have examined the infrared multiphoton dissociation of CH_2CFCl as a function of pressure and laser fluence. The pressure dependence could be interpreted in terms of a competition between rotation hole filling and vibrational relaxation. The fluence-dependent studies showed that the competitive hydrogen halide elimination reactions could be influenced by optical pumping rates near the dissociation threshold. Numerical modeling of the results using the energy-grained master equation allowed us to obtain numerical values for the vibrational relaxation efficiencies of a number of bath gases. The numerical modeling suggests that while our numerical approach is adequate to describe the population changes near the dissociation threshold, and under the influence of collisions, it is (not surprisingly) inadequate to describe potential coherent effects at low levels of internal excitation.

44886 Exact dynamics of a model for a three-level quantum system interacting with a continuous spectrum. Davidson, R.; Kozak, J.J. (Department of Economics, Queen's University, Kingston, Ontario, K7L 3N6, Canada). *Journal of Mathematical Physics (New York);* **24**: No. 7, 1911-1922(Jul 1983).

Previous work of the authors on a three-level quantum system is extended to allow the radiation field in interaction with the system to have a continuous spectrum of possible frequencies. The limiting procedure involved in the passage from discrete to continuous spectra is complicated by the need to express sums over different discrete spectra as integrals with well-behaved limits. Exact expressions are found, for a spontaneous emission problem, for the time evolution of the probabilities that the system be in (each) one of its three states and representative calculations of these probabilities are presented. The emergence of irreversible behavior upon constructing the thermodynamic limit of the problem is plainly seen and this demonstration permits for the first time a discussion of the relative effectiveness of competing decay channels in three-level quantum systems without imposing any ad hoc assumptions (such as exponential decay). Rather, the actual form of the decay emerges as a consequence of the structure and parameters of the Hamiltonian defining the model, and hence one can examine the variety of circumstances in which the evolution can reasonably be described as exponential. The results obtained should be of great use in clarifying certain outstanding conceptual problems in radiation physics, particularly those which deal with the universality of exponential decay in three- (and two-) level quantum systems in interaction with a radiation field and the conditions under which nonexponential or even nonergodic behavior can emerge in such dissipative quantum systems.

44887 Thermal-resistive current filamentation in the cathode plasma of a pinch-reflex diode. Tripathi, V.K.; Ottinger, P.F.; Guillory, J. (Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, Maryland 10742). *Journal of Applied Physics;* **54**: No. 6, 3043-3048(Jun 1983).

Electron current flow drawn off a hollow cylindrical cathode in a pinch-reflex ion diode is observed to have a filamentary structure. Such filamentation can lead to nonuniform anode turn on and ion emission. Consequently, ion beam brightness is degraded. In this context a purely growing thermal-resistive instability in the cathode plasma is examined. The instability causes current filamentation and grows on a time scale comparable to the electron—ion energy equilibration time. Electron inelastic collisions have a stabilizing influence on the instability.

44888 Shear-driven instabilities of annular relativistic electron beams in vacuum. Mostrom, M.A.; Jones, M.E. (Intense Particle Beam Theory Group, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physics of Fluids;* **26**: No. 6, 1649-1658(Jun 1983).

The study of instabilities driven by azimuthal shear (diocotron) and axial shear is extended to annular relativistic beams. The analysis is done nonrelativistically in the beam frame where the instability is assumed to be electrostatic, and the dispersion relation is then transformed back to the laboratory frame where magnetic perturbations are non-negligible. This requires keeping finite axial wavenumber k/sub z/ in the analysis. The axial and azimuthal shears are related through the self-consistent equilibrium, assuming emission from an equipotential cathode. Axial shear destabilizes the diocotron modes at higher azimuthal wavenumbers l. It also produces a set of modes including l = 1 modes, that are unstable as the result of wave—particle interactions. The annular configuration introduces an important second pole in the differential equation.

44889 High-concentration H_2i or D_2^+ ion source. Ehlers, K.W.; Leung, K.N. (Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Review of Scientific Instruments;* **54**: No. 6, 677-680(Jun 1983). Contract AC03-76SF00098.

The characteristics of a multicusp source that can produce a H_3^+ or D_3^+ ion fraction greater than 80% is described.

44890 Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory. Pindzola, M.S.; Griffin, D.C.; Bottcher, C. (Department of Physics, Auburn University, Auburn, Alabama 36849). *Physical Review* [*Section*] *A: General Physics;* **27**: No. 5, 2331-2337(May 1983).

Excitation-autoionization contributions to electron-impact ionization are calculated for several atomic ions in the cadmium isoelectronic sequence. We calculate excitation cross sections in the distorted-wave approximation and compare them in one case to a calculation in the close-coupling approximation. We focus attention on the $4d^{10}5s^2 \rightarrow 4d^9 5s^2 nf$ inner-shell excitations in In^+, Sb^{3+}, and Xe^{6+}. Hartree-Fock atomic structure calculations for the $4d^9 5s^2 nf$ configurations are found to be highly term dependent. Thus our predictions for the total ionization cross section from the 5s subshell for these ions exhibit strong target term dependence. Our Xe^{6+} results are found to be in excellent agreement with the recent experimental crossed-beam measurements of Gregory and Crandall.

44891 Measurement of the cross section for electron-impact ionization of Xe^{6+} ions. Gregory, D.C.; Crandall, D.H. (Physics Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review* [*Section*] *A: General Physics;* **27**: No. 5, 2338-2341(May 1983).

The absolute cross section for electron-impact ionization of Xe^{6+} has been measured from below threshold to 1500 eV with the Oak Ridge National Laboratory crossed-beams apparatus. Excitation of inner-shell electrons to autoionizing states is found to contribute up to a factor of 10 more than direct processes to the single-ionization cross section, and indirect effects dominate the measurement over the entire energy range studied. Good agreement is found with distorted-wave excitation calculations added to Lotz direct-ionization predictions.

44892 High-resolution x-ray spectra from molybdenum ions in the Alcator-C tokamak. Kallne, E.; Kallne, J.; Cowan, R.D. (Harvard-Smithsonian Astrophysical Observatory, Cambridge, Massachusetts 02138). *Physical Review* [*Section*] *A: General Physics;* **27**: No. 5, 2682-2697(May 1983).

We report on measurements of the x-ray line emission in the wavelength region λ = 4.3—5.3 A from molybdenum in charge states between 28+ and 32+. The experimental results were compared with calculated line spectra (also presented) which facilitated the identification of many of the principal 2p-3d, 2s-3p, and 2p-3s transitions. Some indications of weaker satellite-line contributions were also found. The principal 2p-3d transitions were found to be the dominant ones. In particular, Mo^{32+} gave stronger contributions than other charge states for our plasma condition of T/sub e/ = 1.0—1.5 keV while available calculations of relative ion abundances have predicted Mo^{32+} to be relatively strongest at T/sub e/ = 2.5—3.0 keV.

44893 Autoionization emission from transition metals by electron impact. Bader, S.D.; Zajac, G.; Zak, J. (Materials Science and Technology Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review Letters;* **50**: No. 16, 1211-1214(18 Apr 1983).

Intense gain satellites associated with the M/sub 2,3/VV Auger transition have been observed for representative 3d-transition metals. The satellites have line shapes and intensities that resemble those of the M/sub 2,3/ electron-energy-loss and resonant photon-excited spectra of these materials and are identified as being due to autoionization electron emission. This identification satisfies the expectation that the Fano effect should be manifest in both absorption and emission experiments, whether photon or electron excited.

44894 Angular distribution of Xe 5s→εp photoelectrons: Disagreement between experiment and theory. Fahlman, A.; Carlson, T.A.; Krause, M.O. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review Letters;* **50**: No. 15, 1114-1117(11 Apr 1983). Contract W-7405-ENG-26.

The angular asymmetry parameter β for the Xe 5s→εp photoelectrons has been studied with use of synchrotron radiation ($h\nu$ = 28—65 eV). The present results show that the relativistic random-phase approximation theory does not satisfactorily describe the Xe 5s photoionization process close to the Cooper minimum and thus require a renewed theoretical approach. The 5s partial photoionization cross section was obtained over the same photon region and the results agree with experimental values found in the literature.

44895 Population of the three major exit channels in the 3d resonance region of atomic gallium. Krause, M.O.; Cerrina, F.; Fahlman, A. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review Letters;* **50**: No. 15, 1118-1121(11 Apr 1983). Contract W-7405-ENG-26.

The exit channels in the region of the 3d→4p resonance of atomic gallium were determined in a photoemission experiment. The population of the three major channels involving 4p and 4s electrons was measured by the constant-ionic-state method for twenty resonant states between 18.8 and 21.7 eV, and the angular distribution of the emitted electrons was obtained. As a result, an autoionization case in which many resonances and many continua are coupled has been characterized in the most comprehensive experiment to date.

44896 Site-specific fragmentation of small molecules following soft—x-ray excitation. Eberhardt, W.; Sham, T.K.; Carr, R.; Krummacher, S.; Strongin, M.; Weng, S.L.; Wesner, D. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review Letters;* **50**: No. 14, 1038-1041(4 Apr 1983). Contract AC02-76CH00016.

Soft—x-ray excitation involving C 1s electrons in CO and acetone, $(CH_3)_2CO$, is found to result in ionic fragmentation of the original molecule. The fragmentation pattern changes whether the C 1s electron gets ionized or excited into a Rydberg-line orbital or into an antibonding π^* molecular orbital. Morover, the fragmentation occurs specifically around the site of the carbon atom where the optical excitation takes place. Based on these observations one might consider the use of tunable soft x rays to stimulate chemical reactions or to selectively break large organic molecules.

44897 Theoretical study of the lowest ^1u/sub g/$^+$ doubly excited state of H_2. Hazi, A.U.; Derkits, C.; Bardsley, J.N. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physical Review* [*Section*] *A: General Physics;* **27**: No. 4, 1751-1759(Apr 1983).

The energy and width of the 1σ/sub u/^{2} $^1\Sigma$/sub g/$^+$ state of H_2 are calculated using Feshbach projection operators and the Stieltjes moment method. The results are compared with an analysis of the double minima in the potential-energy curves of the $^1\Sigma$/sub g/$^+$ Rydberg states. The doubly excited 1σ/sub u/^{2} configuration is unstable with respect to autoionization for $R < 2.65a_0$, and the autoionization rate is sensitive to both the value of the internuclear separation and the energy of the emitted electron.

44898 Quantum-defect and distorted-wave theory applied to the resonance contribution of inelastic electron scattering. Clark, R.E.H.; Merts, A.L.; Mann, J.B.; Collins, L.A. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *A: General Physics;* **27**: No. 4, 1812-1820(Apr 1983).

The importance of the resonance contributions to inelastic scattering of electrons from atoms and ions has been appreciated for quite some time. We have used an approximate method to compute the resonance contributions to selected inelastic transitions in O VI and S IV and compare our results with other theoretical calculations. We find that our total resonance-enhanced collision strengths are in very good agreement with other calculations. We also can accurately compute the positions of individual resonances but can sometimes be in error by a factor of 2 on individual resonance widths.

44899 Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium. Cohen, J.S.; Martin, R.L.; Wadt, W.R. (Theoretical Division, Los Alamos National Laboratory, University of California, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *A: General Physics;* **27**: No. 4, 1821-1830(Apr 1983).

Slowing-down and capture cross sections have been consistently calculated for μ^-, π^-, K^-, and p-bar in collisions with hydrogen and helium atoms and isotopic variants. Capture-energy distributions are determined using the differential-energy-loss cross sections in the laboratory frame. Capture is found to occur predominantly at energies near or below the ionization potential of the target. Ratios of capture on different species are given as a function of the mole fraction of each species present in mixtures. For π^- in a He-H mixture the reduced capture ratio obtained is ~0.73, slightly less than the experimental value of 0.92 for the $He-H_3$ mixture. In contrast with another recent theoretical calculation and in agreement with experimental analysis, it is found that atomic capture of pions in the helium-hydrogen mixture is only slightly nonlinear. It is pointed out that some prior theoretical treatments are in error because of inconsistent calculation of the slowing-down and capture processes and/or subsequent approximate treatment of the energy transport. Use of capture and transfer rates in muon kinetics, e.g., muon-catalyzed fusion, is discussed.

44900 Coherent Stark levels in beam-foil—excited fast Rydberg atoms. Vager, Z.; Kanter, E.P.; Schneider, D.; Gemmell, D.S. (Physics Division, Argonnne National Laboratory, Argonne, Illinois 60439). *Physical Review Letters;* **50**: No. 13, 954-957(28 Mar 1983). Contract W-31-109-ENG-38.

Hydrogen atoms are excited into high Rydberg states following fast proton impact on a thin carbon foil. The effects of various electromagnetic fields on these atoms are observed by measuring the integral ionization yield in an additional constant electric field. These experiments reveal oscillations in that yield, regularly spaced as a function of electric field. A model is outlined that quantitatively describes the observed field dependence. This new phenomenon indicates selective excitation of the Stark substates.

44901 Comment on high-Rydberg-state production in convoy electron experiments. Breinig, M.; Elston, S.B.; Berry, S.D.; Glass, G.A.; Sellin, I.A.; Vane, C.R. (University of Tennessee, Knoxville, Tennessee 37996). *Physical Review Letters;* **50**: No. 13, 1016(28 Mar 1983).

High-Rydberg-state production in convoy-electron experiments is commented.(AIP)

44902 Vager et al. respond:. Vager, Z.; Zabransky, B.J.; Schneider, D.; Kanter, E.P.; Zhuang, G.Y.; Gemmell, D.S. (Physics Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review Letters;* **50**: No. 13, 1017-1018(28 Mar 1983).

A reply to the comment on high-rydberg-stte production in convoy-electron experiments is given.(AIP)

44903 Radiative corrections to positronium decay. Adkins, G.S. (Department of Physics, University of California, Los Angeles, California 90024). *Annals of Physics (New York);* **146**: No. 1, 78-128(Mar 1983). Contract AM03-76SF00034;AT03-81ER40024.

In this work a method for calculating radiative corrections to positronium decay is presented that is direct, and allows for a systematic extension applicable to the calculation of corrections beyond the first [o(α)] correction. An expression for the decay amplitude in terms of the Bethe—Salpeter is employed. The Bethe—Salpeter wavefunction is evaluated perturbatively in a scheme having a lowest-order bound state equation that is exactly soluble. The decay amplitude is evaluated in Coulomb gauge, without the introduction of a photon mass. One-loop renormalization in Coulomb gauge is shown to be consistent. Using this method the known analytic result for the o(α) correction to the parapositronium decay rate is obtained. The same method is applied to orthopositronium, and the existing theoretical discrepancy in the value of the o(α) correction to the decay rate is resolved. This o(α) correction is obtained with an error which corresponds to an uncertainty in the total rate much smaller than $\alpha^2\Gamma$/sub LO/ (where Γ/sub LO/ is the lowest-order rate). Also, the o(α) correction to the differential decay rate is computed for the first time.

44904 Two-state models of radiative collisions and related ionization effects. Payne, M.G. (Oak Ridge National Lab., TN); Baker, H.C. *Proceedings of the International Conference on Lasers;* 403-410(1981). Contract W-7405-ENG-26.

A two-state model of processes of the type A(i) + B(i) + N h-bar ω → A(F) + B(F) is presented. A general solution is given to the two-state model within the approximations of straight-line trajectories for the relative nuclear motion and dipole-dipole interatomic interaction. The processes Cs(6s/sub 1/2/) + Cs(6s/sub 1/2/) + 2 h-bar ω(ω ~ 11,455 cm^{-1}) → Cs(6P/sub 3/2/) + Cs(6s/sub 1/2/) and $Xe(5p^5(^2P/sub\ 3/2/)6p[3/2]_1)$ + h-bar ω ~ 6177 A + $Ar(3p^6)$ → $Xe(5p^6)$ + Ar $(3p^5(^2P/sub\ 1/2/)4s[1/2]_1$ are discussed as special cases.

6404 Fluid Physics

REFER ALSO TO CITATION(S) 44424, 44434

44905 (INIS-mf—7638) Simulation of gas compressible flow by free surface water flow. Altafini, C.R.; da Silva Ferreira, R.T. . (Santa Catarina Univ., Florianopolis (Brazil). Dept. de Engenharia Mecanica). 1981. 11p. (In Portuguese). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780901.

The analogy between the water flow with a free surface and the compressible fluid flow, commonly called hydraulic analogy, is analyzed and its limitations are identified. The water table is the equipment used for this simulation, which allows the quatitative analysis of subsonic and supersonic flow with a low cost apparatus. The hydraulic analogy is applied to subsonic flow around circular cylinders and supersonic flow around cones. The results are compared with available theoretical and experimental data and a good agreement is achieved.

44906 (INIS-mf—7648) Mathematical model for the calculation of internal turbulent flow. Nicolau, V.deP.; do Valle Pereira Filho, H. (Santa Catarina Univ., Florianopolis (Brazil). Dept. de Engenharia Mecanica). 1981. 9p. (In Portuguese). (CONF-811273—16). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780908.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The Navier-Stokes and the turbulent kinetic energy equations for the incompressible, turbulent and fully developed pipe flow, were solved by a finite difference procedure. The distributions of the mean velocity, turbulent shear stress and turbulent kinetic energy were obtained at different Reynolds numbers. Those numerical results were compared with experimental data and the agreement was good in whole cross section of the flow.

44907 (INIS-mf—7665) Analysis of the flow close to a hump at the wall of a circular pipe. Von Linsingen, I.; da Silva Ferreira, R.T. (Santa Catarina Univ., Florianopolis (Brazil). Dept. de Engenharia Mecanica). 1981. 12p. (In Portuguese). (CONF-811273—25). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780917.

From 6. Brazilian congress of mechanical engineering; Rio de Janeiro, Brazil (15 Dec 1981).

The laminar fully developed flow close to a circumferential square hump placed at the wall of a smooth circular pipe is studied. An experimental set up was used to determine the reattachment length and the velocity and shear stress profiles of the flow for different Reynolds numbers. Simple relations were obtained from the analysis of the data for the reattachment length, maximum velocity and maximum shear stress in different positions along the flow and different Reynolds numbers.

44908 (NP—3902474) Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands. (Rijksuniversiteit Leiden (Netherlands). Kamerlingh Onnes Lab.). 1980. 22p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902474.

In this issue the articles published in 1980 by scientists in the Kamerlingh Onnes Laboratory are listed. In the case that an article is written in co-operation with authors from other institutes, these institutes are mentioned after the author's names. The articles are arranged in groups, according to the division of the research in the laboratory.

44909 Direct measurements of aerosol diffusion constants in the intermediate Knudsen regime. King, G.B.; Sorensen, C.M.; Lester, T.W.; Merklin, J.F. (Department of Nuclear Engineering and Physics, Kansas State University, Manhattan, Kansas 66506). *Physical Review Letters;* **50**: No. 15, 1125-1128(11 Apr 1983). Contract AC02-80ER10677.

The authors have measured the diffusion constants of aerosols whose size compares to the mean free path of the gas in three different aerosols. Their experimental diffusion constants do not

agree with the kinetic-theory calculations in this intermediate Knudsen regime.

44910 **Number of modes governing two-dimensional viscous, incompressible flows.** Foias, C.; Manley, O.P.; Temam, R.; Treve, Y.M. (Indiana University, Bloomington, Indiana 47405). *Physical Review Letters;* **50**: No. 14, 1031-1034(4 Apr 1983). Contract AC02-82ER12049;AC03-78ET53072.

Recent efforts to estimate the number of modes sufficient for the approximate solutions of Navier-Stokes equations in two dimensions are summarized. Several such estimates have been obtained, and their relations to one another are discussed. The physical significance of the results is noted and used to infer the possible nature of similar estimates in three dimensions.

6450 High Energy Physics

REFER ALSO TO CITATION(S) 43541

44911 **(DOE/ER/03230—T2) Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983.** Kirsch, L.E.; Schnitzer, H.J.; Bensinger, J.R.; Abbott, L.F. (Brandeis Univ., Waltham, MA (USA). Dept. of Physics). 1983. Contract AC02-76ER03230. 23p. NTIS, PC A02/MF A01. Order Number DE83013962.

Equipment testing and experiments at the Multiparticle Spectrometer facility at Brookhaven are described, and involvement with the Collide Detector program at Fermilab is briefly described. Theoretical research on composite models, supersymmetry and supergravity, gauge theories, and studies on the phenomology of gauge theories are described. (WHK)

6451 Particle Interactions And Properties - Experimental

REFER ALSO TO CITATION(S) 44576

44912 **(BNL—33263) Elastic neutrino-electron scattering: a progress report on Exp734 at Brookhaven.** Abe, K.; Ahrens, L.A.; Amako, K. (Brookhaven National Lab., Upton, NY (USA); Brown Univ., Providence, RI (USA)). 1983. Contract AC02-76CH00016. 12p. (CONF-830374—1). NTIS, PC A02/MF A01. Order Number DE83014770.

From Moriond conference on electroweak interactions; Les Arcs, France (13 Mar 1983).

I will report preliminary results on elastic neutrino-electron scattering from data taken with the 200 ton segmented liquid scintillator - proportional drift-tube neutrino detector at Brookhaven. Features of the detector (such as the active target and long radiation length) permit a uniquely clean signal. Prospects of results from the completed analysis and further data taking are discussed.

44913 **(CERN—EP/82-29) Multiparticle hadronic systems produced in high-energy (pp) interactions, and comparison with (e^+e^-).** Zichichi, A. (European Organization for Nuclear Research, Geneva (Switzerland)). 11 Mar 1982. 34p. (CONF-810760—24). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83902502.

From International conference on high energy physics (Or European Physical Society conference); Lisbon, Portugal (9 Jul 1981).

The problem of studying the properties of multiparticle hadronic systems produced in high-energy hadronic interactions, has recently acquired great interest. This was motivated by the discovery (1) of the analogies between the multiparticle hadronic states produced in (pp) interactions, and those produced in (e^+e^-) annihilation. This review will cover a series of results obtained by the following groups: the Bologna-CERN-Frascati (BCF) Collaboration; the Ames-CERN-Heidelberg-Dortmund-Warsaw (ACHDW) Collaboration; and the Brussels-CERN-Genova-Mons-Nijmegen-Serpukhov (BCGMNS) Collaboration. The new feature of the BCF work is the fact that, in order to establish these similarities, the basic principle is to evaluate, for each (pp) interaction, the correct energy available for particle production.

44914 **(CERN-EP—82-39) Beauty experiments at the SPS.** Musset, P. (European Organization for Nuclear Research, Geneva (Switzerland)). 31 Mar 1982. 20p. (CONF-811195—8). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83902485.

From Europhysics conference on the search for charm, beauty and truth at high energy; Erice, Italy (15 Nov 1981).

Portions are illegible in microfiche products.

Several experiments, one already in the course of analysis and others to be done in the near future, have been designed to search for beauty at the SPS. They are of a hybrid character, combining the capabilities of emulsion with a selective signature of the beauty production in emulsion. The selection is done by an on-line trigger and by the off-line analysis. The main aims of these experiments are the direct observation of B-particles and of their decays, the measurement of their lifetimes - possibly different for B+- and for B^0, and the measurement of the branching ratio $b \rightarrow c/b \rightarrow u$. General features of the experiments are discussed. (WHK)

44915 **(DESY—82-058) Measurement of charge properties of quark jets at PETRA.** Berger, C.; Genzel, H.; Grigull, R.; Lackas, W.; Raupach, F.; Wagner, W.; Klovning, A.; Lillestoel, E.; Olsen, J.M.; Ackermann, H. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Aug 1982. 17p. NTIS (US Sales Only), PC AXX/MF A01. Order Number DE83750211.

PLUTO collaboration.

The charge properties of quark jets produced in e^+e^--annihilation at 30 GeV center of mass energy have been investigated with the PLUTO detector. We find that the mean absolute value of the jet charge < vertical stroke Qsub(jet) vertical stroke > = 0.55 +- 0.25 is small compared to the expectation from statistical models. Long range charge correlations are observed. These results indicate that the sign of the primary quark charge can be obtained with high probability from the charge of the jet and its distribution in the jet.

44916 **(DESY—82-060) Differential 3-Jet cross section in e^+e^--annihilation and comparison with 2sup(nd)-order predictions of QCD and Abelian vector theory.** Bartel, W.; Cords, D.; Dietrich, G.; Dittmann, P.; Eichler, R.; Felst, R.; Haidt, D.; Krehbiel, H.; Meier, K.; Naroska, B. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Sep 1982. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750210.

JADE Collaboration.

Differential 3-jet cross sections have been measured in e^+e^--annihilation at an average c.m. energy of 33.8 GeV and were compared to 1st and 2nd-order predictions of QCD and of a QED-like Abelian vector theory. QCD provides a good description of the observed distributions. The inclusion of 2nd-order effects reduced the observed quark gluon coupling strength by about 20% to αsub(s) = 0.16 +- 0.015 (stat.) +- 0.03 (system.). The Abelian vector theory is found to be incompatible with the data.

44917 **(DESY—82-086) Experimental evidence for differences in <pperpendicular to> between quark jets and gluon jets.** Elsen, E.; Heinzelmann, G.; Kado, H.; Petersen, A.; Warming, P.; Weber, G.; Bethke, S.; Heintze, J.; Hellenbrand, K.H.; Heuer, R.D. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Dec 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750904.

JADE Collaboration.

We have studied the transverse momentum psub(perpendicular to) of particles within jets as a function of jet energy using planar 3-jet final states produced in the reaction e^+e^- -> hadrons at c.m. energies of 22 GeV and 29 - 36.4 GeV. At a given jet energy, the mean value <psub(perpendicular to)> of the lowest energy jet is found to be larger than that of the other jets. First order QCD simulations indicate, rather independently of the fragmentation scheme used, that the lowest energy jet has the largest probability of representing the debris of the gluon. The observed difference in <psub(perpendicular to)> of the jets cannot be reproduced by a model with identical quark and gluon fragmentations. Assuming quark and gluon jets to differ only in the r.m.s.

transverse momentum sigmasub(q) of the secondary quarks, a value of about 300 MeV for quark jets and of about 500 MeV for gluon jets describe the <psub(perpendicular to)> behaviour of the data.

44918 (DESY—83-002) Search for new heavy leptons at PETRA. Elsen, E.; Heinzelmann, G.; Kado, H.; Petersen, A.; Warming, P.; Weber, G.; Bethke, S.; Heintze, J.; Hellenbrand, K.H.; Heuer, R.D. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Jan 1983. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750903.

JADE Collaboration.

Results are presented on a search for new heavy leptons, a sequential heavy lepton Lsup(+-), and an electron-type neutral heavy lepton E^0, using the JADE detector at PETRA. No evidence for either of these particles was observed. A lower mass limit for the Lsup(+-) is determined to be 18.0 GeV/c^2 at 95% c.l. Lower mass limits for the E^0 are 24.5 GeV/c^2 and 22.5 GeV/c^2, in the case of universal V+A and V-A coupling at the W-e-E vertex, respectively.

44919 (DESY—83-080) Investigation of two photon final states in e^+e^- annihilation at $<\sqrt{5}> = 34.2$ GeV. D'Agostini, G.; Apel, W.D.; Banerjee, S.; Bodenkamp, J.; Engler, J.; Fluegge, G.; Fries, D.C.; Fues, W.; Gamerdinger, K.; Hopp, G. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Dec 1982. 9p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750902.

CELLO Collaboration.

Two photon final states in e^+e^- annihilation have been analyzed at c.m. energies around 34 GeV. Good agreement with QED is observed. Lower limits for the QED cutoff paramters of Asub(+) > 59 GeV and Asub(>) 44 GeV are determined. A search for two photons with missing energy yields an upper limit for the production of neutral particles which decay into a photon and a non-interacting particle. Constraints on the mass and the coupling strength of supersymmetric photinos are discussed.

44920 (DOE/ER/01195—485) Strange quark suppression in 225 GeV/c pi-minus beryllium interactions. Schoessow, P.V. (Illinois Univ., Urbana (USA). Dept. of Physics). 1983. Contract AC02-76ER01195. 126p. (COO—1195-485). NTIS, PC A07/MF A01. Order Number DE83014728.

Thesis.

The Chicago Cyclotron Magnet Spectrometer at Fermilab was used to study the production of ω(783) and phi(1020) mesons in 225 GeV/c π^- Be interactions via their decays into $\mu^+\mu^-$. Basedon the observed phi/ω production ratio, the strange quark suppression factor λ was determined to be 0.31 +- 0.05, in good agreement with a world average of about 0.29.

44921 (FERMILAB-Conf—83/54-THY/EXP) Survey of nu/sub μ/e physics with emphasis on recent Fermilab results. Morfin, J.G. (Fermi National Accelerator Lab., Batavia, IL (USA)). Jun 1983. Contract AC02-76CH03000. 15p. (CONF-830231—3). NTIS, PC A02/MF A01. Order Number DE83014780.

From Europhysics study conference on electroweak effects at high energies; Erice, Italy (1 Feb 1983).

Portions are illegible in microfiche products.

From both an experimental and an historical point of view it is particularly appropriate to summarize the development of nu/sub μ/e^- physics at this time. Historically, it was ten years ago last week that the announcement of the first nu/sub μ/e^- event was sent from Aachen to the other members of the Gargamelle Collaboration. The event, shown in Figure 2, is of a single electron identified via its characteristic bremsstrahlung and curvature. The significance of this event far exceeds its visual impact. With a background of less than .03 events, it became the first solid indication for the existence of the weak neutral current. On the experimental front, the investigation of the nu/sub μ/e interaction is about to enter a new phase, having graduated from experiments yielding 2 to 3 events to those which will be analyzing hundreds of events. With these high statistics experiments it should be possible to study the differential as well as the total crossections of nu/sub μ/e and anti nu/sub μ/e scattering.

44922 Experimental study of the A dependence of inclusive hadron fragmentation. Barton, D.S.; Brandenburg, G.W.; Busza, W. (Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). *Physical Review [Section] D: Particles and Fields;* **27**: No. 11, 2580-2599(1 Jun 1983).

Data are presented on the inclusive production of π^{+-}, K^{+-}, p, and p-bar for π^+, K^+, and protons incident on nuclear targets at 100 GeV. The results cover the kinematic range 30< or =P< or =88 GeV/c for P/sub t/ = 0.3 and 0.5 GeV/c. The observed A dependence of the invariant cross sections exhibits remarkable simplicity, which does not naturally follow from current models of particle production. The results show that the hypothesis of limiting fragmentation can be extended to include collisions with nuclei.

44923 Elastic scattering of πip and K^{+-} on protons at 100 and 200 GeV/c. Kalbach, R.M.; Krueger, K.W.; Pifer, A.E. (University of Arizona, Tucson, Arizona 85721). *Physical Review [Section] D: Particles and Fields;* **27**: No. 11, 2752-2754(1 Jun 1983).

Data are presented on elastic πp and Kp scattering for values of -t up to 2.5 and 3.5 (Gev/c)^2 at incident momenta of 100 and 200 GeV/c, respectively. All of the cross sections are found to be nearly identical, although there is some momentum dependence of the π^+p data; a small systematic difference observed between pion and kaon data cannot be explained by geometrical scaling.

44924 Search for fractional charges. Liebowitz, D.; Binder, M.; Ziock, K.O.H. (Department of Physics, University of Virginia, Charlottesville, Virginia 22901). *Physical Review Letters;* **50**: No. 21, 1640-1643(23 May 1983).

The results of a search for fractional charges on 24 steel spheres with a total mass of 720 μg are reported. No fractional charges, spurious or otherwise, greater than 0.15e were found.

44925 Search for production of narrow p-barp states with a 5-Gev/cp-bar beam. Bensinger, J.; Kirsch, L.; Morris, W. (Brandeis University, Waltham, Massachusetts 02154). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1417-1425(1 Apr 1983).

A high-statistics search for the production of narrow p-barp states with a p-bar beam at 5 GeV/c finds no evidence for such states from threshold up to 2.3 GeV. In particular, we set an upper limit (95% C.L.) of 9 nb for any state below 1.95 GeV with Γ< or =5 MeV in the reaction p-barp→p-barpπ^0. Comparable limits are set for the reaction p-barp→p-barp(rho+ω) and inclusive p-barp production.

44926 Σ Hypernuclei. Dover, C.B.; Gal, A. (Brookhaven National Laboratory, Upton, New York 11973). *Annals of Physics (New York);* **146**: No. 2, 309-348(1 Apr 1983). Contract AC02-76CH00016.

We consider the possibility of forming doubly strange Ξ hypernuclei via the (K^-, K) reactions on various nuclear targets. Because of the high momentum transfer involved, even at 0°, the formation of high spin states is strongly favored. The available experimental information on the elementary processes $K^-p \to K^+\Xi^-$ or $K^0\Xi^0$ is reviewed, leading to the determination of an optimum incident K^- momentum of about 1.9 GeV/c for the forward formation of discrete Ξ hypernuclear states. The cross section for the process $\Xi N \to \Lambda\Lambda$, responsible for the damping width of Ξ states in nuclei, is estimated theoretically and the very limited experimental data are also reviewed. The resulting Ξ hypernuclear widths are of order 5 MeV. Emulsion data which have been interpreted as due to the existence of $\Lambda\Lambda$ and Ξ^- hypernuclei are discussed and used to obtain an approximate Ξ nuclear well-depth of 21—24 MeV. For this range of values, spectra of single particle Ξ^- states are obtained, and calculated angular distributions for the formation of simple Ξ^- particle—proton hole states in ^{4}He, ^{12}C and ^{28}Si targets are presented. The peak 0° lab cross section at P/sub lab/ = 1.9 GeV/c for such states ranges from tens of nb/sr to about 1 μb/sr. We briefly mention other methods for forming Ξ hypernuclei, such as the three body reaction $K^- \to K\pi\Xi$ (K/sup em-dash/p → $K^+K^0\Omega^-$ for Ω^- hypernuclei).

44927 Csub(LL)=(L,L;0,0) measurements and a structure due to a P partial wave in the pp system. Burleson, G.R.; Cottingame, W.B.; Greene, S.J.; Stuart, S. (New Mexico State Univ., Las Cruces (USA). Dept. of Physics); Hoffman, E.W.; Jarmer, J.J. (Los Alamos National Lab., NM (USA)); Auer, I.P.; Ditzler, W.R.; Hill, D.; Imai, K. *Nuclear Physics* [*Section*] *B;* 213: No. 3, 365-370(21 Mar 1983).

Measurements of Csub(LL) of pp elastic scattering near THETAsub(c.m.)=90° at thirteen energies between 300 and 800 MeV are reported. These, together with previous values of Csub(NN), are used to extract values of two quantities, fsub(s) and fsub(t), which contain only spin-singlet and only coupled spin-triplet partial waves, respectively. The fsub(s) curve, which is not dependent on Csub(LL), exhibits the behavior expected for the previously conjectured $^1D_2$ resonance. The fsub(t) curve also exhibits a resonance-like behavior, which could be due either to the $^3P_0$ or the $^3P_2$ partial wave.

44928 Variation of the strong coupling constant from a measurement of the jet energy spread in e^+e^- annihilation. Loehr, B.; Hollebeek, R.J.; Richter, B.; Schlatter, D.; Abrams, G.S.; Amidei, D.; Blocker, C.A.; Boyarski, A.M.; Breidenbach, M.; Burke, D.L. (Stanford Linear Accelerator Center, CA (USA); California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Physics; Harvard Univ., Cambridge, MA (USA). Dept. of Physics). *Physics Letters,* [*Section*] *B;* 122: No. 1, 90-94(24 Feb 1983).

A measurement of jet energy spread in the reaction e^+e^- -> hadrons is presented. Using a jet calculus model for the jet development we determine the variation of the strong coupling constant with respect to momentum transfer. The observed variation is consistent with that expected for QCD over a wide range of momentum transfers. This method alone is not sufficient to distinguish QCD from simple limited transverse momentum models.

6452 Particle Interactions And Properties - Theoretical

REFER ALSO TO CITATION(S) 44555, 44926, 44926

44929 (INIS-mf—8024) Meson theory of low-energy elastic nucleon-antinucleon scattering. Gruebl, G.J. (Innsbruck Univ. (Austria)). Dec 1980. 87p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83780877.

Up to now it has been impossible to explain the S,T,U-enhancements of the elastic and total inelastic nucleon(N)-antinucleon(anti N)-scattering cross-sections within the 'One Boson Exchange Potential'(OBEP)-model supplemented by some phenomenological procedure taking into account the strong inelasticity of the N anti N-interaction. The reasons for this failure of the model are investigated in this work. It is done along three lines: Firstly by a closer inspection of the selfconsistency of the semiphenomenological N anti N-OBEP-model; secondly by a partial-cross-section analysis of the empirical N anti N-scattering data, which allows to extract an approximate range of annihilation processes; thirdly by the calculation of the p-wave contribution of the meson-theoretical 'two pion annihilation box'-graph to elastic N anti N-scattering. It is shown that the range of the box-graph is around ten times larger than is expected from the heuristic time-energy uncertainty argument. This is in accordance with the empirical value of the annihilation range, which is obtained. From this dominant role of the annihilation processes it is concluded that the N anti N-OBEP-model must be supplemented by some theory-inspired annihilation model instead of a purely phenomenological one to be able to explain the Baryonium resonances, if this is possible at all within the framework of meson theory. (Author).

44930 (LA-UR—83-1839) Hydrodynamics and relativistic heavy-ion collisions. Strottman, D. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 29p. (CONF-8304104—1). NTIS, PC A03/MF A01. Order Number DE83013865.

From Nordic winter school; Hemsedal, Norway (1 Apr 1983).

The hydrodynamic model as applied to heavy-ion collisions is introduced. The Euler equations are derived for both relativistic and non-relativistic domains. The effects of imposing relativistic invariance are discussed. Concepts proposed to analyze 4π exclusive reactions are introduced. Selected theoretical results are presented for reactions in which the projectile has a laboratory energy of 400 MeV per nucleon to 100 GeV per nucleon.

44931 (LBL—16135) Aspects of data on the breakup of highly excited nuclei. Warwick, A.I.; Wieman, H.H.; Gutbrod, H.H.; Ritter, H.G.; Stelzer, H.; Weik, F.; Kaufman, S.B.; Steinberg, E.P.; Wilkins, B.D. (Lawrence Berkeley Lab., CA (USA)). May 1983. Contract AC03-76SF00098. 8p. (CONF-830674—1; CONF-830675—1). NTIS, PC A02/MF A01. Order Number DE83014902.

From 6. international Balaton topical conference on high energy nuclear physics; Balatonfured, Hungary (6 Jun 1983).

Portions are illegible in microfiche products.

There is an awakening of theoretical interest in the mechanisms by which nuclear fragments ($4 \leqq A \leqq 150$) are produced in violent collisions of heavy ions. With this in mind we review some aspects of the available experimental data and point out some challenging features against which to test the models. The concept of evaporation is tremendously powerful when applied to pieces of nuclei of low excitation (1 or 2 MeV/u). Current interest focuses on higher excitations, at the point where the binding energy of the system vanishes. This is the transition from liquid nuclei to a gas of nucleons, and it may be that the critical phenomena that certainly exist in infinite nuclear matter will be manifest in finite nuclei under these conditions.

44932 (LBL—16197) Meson emissions from quark-gluon plasma through formation and fission of chromoelectric flux tubes. Matsui, T.; Banerjee, B.; Glendenning, N.K. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 7p. (CONF-830675—2). NTIS, PC A02/MF A01. Order Number DE83014903.

From 6. high energy heavy ion study and 2. workshop on anomalons; Berkeley, CA, USA (28 Jun 1983).

Portions are illegible in microfiche products.

In the present work we study a facet of the plasma evolution, the formation and radiation of mesons at the surface of hog plasma. The surface meson radiation would play two important roles. First, it may carry some information about the pre-freezeout stage of the plasma evolution. Second, it causes a pressure decrease at the surface that works against the expansion. In the extreme, the plasma may extinct very rapidly by the surface meson radiation without collective expansion. It is very unclear how the incident quark degrees of freedom is converted into mesonic degrees of freedom and how the color confinement works in such a process. We have studied the problem by fully employing the chromoelectric flux tube model. We found that their parametrization is quite unsatisfactory and is actually incompatible with a dynamical description of color confinement. We briefly recapitulate our treatments and findings.

44933 Quark model with one-gluon corrections. Radially excited states. Amaral, M.G.D.; Zagury, N. (Department of Physics, Pontificia Universidade Catolica, Rio de Janeiro, Brazil). *Physical Review* [*Section*] *D: Particles and Fields;* 27: No. 11, 2668-2677(1 Jun 1983).

Under the assumption that quarks are confined, in a first approximation, by a relativistic potential $U(r) = (1/2)(1+\beta)V(r)$, and taking into consideration one-gluon corrections, we have calculated the mass spectrum for the first radially excited positive-parity baryons.

44934 N/sup /(1470) in the cloudy bag model. Umland, E.; Duck, I.; von Witsch, W. (T. W. Bonner Nuclear Laboratory, Rice University, Houston, Texas 77251). *Physical Review* [*Section*] *D: Particles and Fields;* 27: No. 11, 2678-2685(1 Jun 1983). Contract AS05-81ER40032.

We investigate the N*(1470) in the context of the cloudy bag model. Gluonic and pionic self-energy terms mix the two orthogonal SU(6) N* states. After correcting the mass for spurious center-of-mass motion, we obtain a doublet of states with masses of

1418 and 1533 MeV, respectively. A calculation of $N^* \to N\pi$ and $N^* \to \Delta\pi$ partial widths is in good agreement with experiment.

44935 Static-bag-source meson field theory: Strong-coupling approximation. Parmentola, J.A. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] D: Particles and Fields;* **27**: No. 11, 2686-2707(1 Jun 1983). Contract W-31-109-ENG-38.

In this paper we discuss quantum-mechanical strong-coupling calculations on a static-source meson field theory in which only the nucleon isospin degrees of freedom are coupled linearly to an isovector-scalar meson field. The nucleon source function is of the chiral bag type, namely a shell source. We perform numerical calculations in the strong-coupling approximation, namely for g>>(8$\pi^2\mu$R)/sup 1/4/, where g is a dimensionless bare coupling constant, μ is the meson mass, and R is the bag size. We demonstrate that the corrections to our lowest-order approximation to the dressed nucleon wave function decrease as the coupling strength increases according to the above inequality. We find that there exist reasonable values of the parameters, say g~4 and R~0.3 fm, for which the lowest-order approximation to the dressed nucleon state of this model is good. We also find collective excitations of the dressed nucleon which are rotational and vibrational excitations in isospin space. The lowest-lying collective excitation is a rotational state which is identified as the Δ in this model. Furthermore, we generalize the model field theory by introducing a feature of the cloudy-bag-model Hamiltonian, namely, an intrinsic isobar source coupled to the meson field. We find that the strong-coupling approximation is realized for significantly smaller values of the bare coupling constant or larger values of the bag size when compared to the previous model. We also find a total bare-Δ component on the dressed nucleon state of 36%. Finally, we numerically solve the meson-nucleon scattering problem in the first model by employing the reaction theory of Feshbach.

44936 Phenomenological surface inertia in the MIT bag model. Mulders, P.J.; Bhamathi, G.; Heller, L.; Aerts, A.T.; Kerman, A.K. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] D: Particles and Fields;* **27**: No. 11, 2708-2714(1 Jun 1983).

A phenomenological kinetic-energy term for the surface of the MIT bag is added to the Hamiltonian, and its consequences are studied for light-quark systems and heavy-quark systems. The value of the surface inertia must be less than ~0.2 GeV in order to avoid a fifth S state in the portion of the Y spectrum in which only four have been observed.

44937 Decay of the Higgs boson into heavy-quarkonium states. Keung, W. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] D: Particles and Fields;* **27**: No. 11, 2762-2764(1 Jun 1983). Contract AC02-76CH00016.

The exclusive production of a pair of heavy-quarkonium states V (= psi/J,Y,zeta,. . .) from the decay of the Higgs boson in the standard model is studied in the approximation of zero binding energy. The branching fractions could only be as large as 10^{-5} around the kinematic thresholds. The alternative process $H \to V\gamma$ is also studied and found to have branching fractions usually less than 10^{-3}.

44938 Binding energy estimates for charmed few-body systems. Gibson, B.F.; Dover, C.B.; Bhamathi, G.; Lehman, D.R. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] C: Nuclear Physics;* **27**: No. 5, 2085-2089(May 1983).

By solving exact three- and four-body equations, we obtain estimates of the binding energies of light nuclei containing one charmed C_6^+ baryon.

44939 General infrared and ultraviolet properties of the gluon propagator in the axial gauge. West, G.B. (Stanford Linear Accelerator Center, Stanford University, Stanford, California 94305). *Physical Review [Section] D: Particles and Fields;* **27**: No. 8, 1878-1893(15 Apr 1983). Contract AC03-76SF00515.

Some general properties of the gluon propagator are studied in the axial gauge with emphasis on its infrared and ultraviolet behavior. In spacelike gauges we derive a Lehmann representation and consequently a Kaaumlllen sum rule for Z_6. We investigate in some detail the apparent inconsistency between $Z_6>1$ (antiscreening and the origin of asymptotic freedom) and the positivity of the Hilbert space due to the absence of ghosts which suggests $Z_6<1$. We show that in timelike gauges there is no Lehmann representation so that the propagator is no longer analytic in its virtual mass parameter. General positivity coupled with these results restricts certain IR singularities from being any worse than they are in QED, so consequently it is not possible to use the IR behavior of the propagator in this gauge (whether timelike or spacelike) as a signal for confinement if the Wilson loop is used as the criterion. We also show that a judicious use of the renormalization group involving a variation of the axial-gauge parameter allows one to drive the theory into the IR in such a way that the effective coupling constant is the asymptotically free one. We use this result to show that the presence of nonperturbative contributions of the generic form e/sup -c//g^2 associated with instantons leads to a power-law correction to the IR behavior of the propagator.

44940 Neutral-current effects in quantum-chromodynamic four-jet production. Clavelli, L.; Gehlen, G.V. (High Energy Physics Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1495-1511(1 Apr 1983).

We investigate the influence of parity-violating neutral currents on QCD four-jet production in e^+e^- annihilation. Explicit expressions for the squared matrix elements in general weak models are presented. It is shown that in the standard model axial-vector currents change the acoplanarity distributions normalized to the total cross section only at the 10^{-3} level. Chirality effects of the four jets are also strongly suppressed. However, angular asymmetries of the acoplanarity distributions are found to be 20—60 %.

44941 Muon polarization in K/sub L/$\to\mu^+\mu^-$. Herczeg, P. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1512-1517(1 Apr 1983).

The longitudinal polarization of muons in the decay K/sub L/$\to\mu^+\mu^-$ is considered in the presence of nonelectroweak interactions.

44942 Beyond the static limit for quarkonium decays. Keung, W.; Muzinich, I.J. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1518-1524(1 Apr 1983). Contract AC02-76CH00016.

We examine the problems of calculating the leading relativistic corrections to heavy-quarkonium decays [relative $O(v^2)$] within the context of QCD. The incorporation of constituent motion in a consistent manner poses nontrivial problems associated with gauge invariance and multiple counting with higher-order contributions in the coupling constant. Although we were unable to resolve these questions in a completely satisfactory manner, we present an improved static limit where the kinematic relativistic corrections are included through binding effects. Our results are gauge invariant and in qualitative agreement with the relative size of relativistic corrections suggested in the analysis of the branching ratio of $\Gamma(3g)/\Gamma(ll\text{-bar})$ in the psi/J and Y systems in QCD.

44943 Meson, baryon, and glueball masses in the MIT bag model. Carlson, C.E.; Hansson, T.H.; Peterson, C. (College of William and Mary, Williamsburg, Virginia 23185). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1556-1564(1 Apr 1983). Contract AC02-76ER03069;AC03-76SF00515.

We present a consistent and unified study of the spectrum of low-lying mesons, baryons, and glueballs using the MIT bag model, incorporating several improvements in the model. We correct for the center-of-mass motion, use a running coupling $\alpha_s(R)$, include self-energy terms for quarks and gluons confined in a cavity, and get the bag constant from a model of the QCD vacuum. Our fit to the meson and baryon spectrum, including the pion, is good and predictions for the glueball spectrum are given.

44944 Higgs-boson effects in grand unified theories. Mohapatra, R.N.; Senjanovic, G. (Department of Physics, City College of the City University of New York, New York, New York 10031). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1601-1612(1 Apr 1983). Contract AC02-76CH00016.

It is argued that fine tuning of a minimal set of parameters, needed to fix the hierarchy of gauge-boson masses and a knowledge of intermediate symmetry groups, leads to "natural" mass scales for physical Higgs bosons in grand unified theories. This is applied to $\Delta B = 2$ transitions in models based on SU(5), SO(10), SU(16), and $[SU(2N)]^4$. It turns out that the Higgs bosons which mediate $\Delta B = 2$ neutron-antineutron and hydrogen-antihydrogen oscillations become superheavy, and so such transitions can be observable only in theories with low unification scales, such as SU(16) and $[SU(8)]^4$, if we adhere to the hypothesis of minimal fine tuning.

44945 Production of heavy quarks: A nonperturbative approach. Halzen, F.; Keung, W.; Scott, D.M. (Physics Department, University of Wisconsin, Madison, Wisconsin 53706). *Physical Review [Section] D: Particles and Fields;* **27**: No. 7, 1631-1633(1 Apr 1983).

We identify a way of producing heavy quarks overlooked by perturbative QCD. It successfully accommodates the data on photoproduction and hadroproduction of heavy quarks. Rates at higher energies are expected to be significantly in excess of those predicted by perturbative QCD.

44946 Cosmological bounds on heavy neutrinos through the decays $\nu_H \to 3\nu_L$ and $\nu_H \to \nu_L\gamma$. McKellar, B.H.J. (Los Alamos National Lab., NM (USA). Theoretical Div.); Pakvasa, S. (European Organization for Nuclear Research, Geneva (Switzerland)). *Physics Letters, [Section] B;* **122**: No. 1, 33-36(24 Feb 1983).

We derive a cosmological bound on the branching ratio GAMMA(vsub(H) -> vsub(L)γ)/GAMMA(vsub(H) -> 3vsub(L)). Then we show that, in some of the models proposed which attempt to evade cosmological bounds on the masses of heavy neutrinos through enhancement of the decay mode vsub(H) -> 3vsub(L), this cosmological bound on the induced rate for the radiative mode vsub(H) -> vsub(L)γ imposes severe constraints on the parameters of the model.

44947 Threshold pion photoproduction from the trinucleon. Friar, J.L. (Los Alamos National Lab., NM (USA). Theoretical Div.); Tomusiak, E.L. (Los Alamos National Lab., NM (USA). Theoretical Div.; Saskatchewan Univ., Saskatoon (Canada). Dept. of Physics). *Physics Letters, [Section] B;* **122**: No. 1, 11-17(24 Feb 1983).

With 30 refs.

Neglecting pion rescattering and certain exchange currents, we perform a microscopic calculation of threshold pion photoproduction in order to ascertain the effect of binding. We show that there are two opposite limits determined by a single parameter: the ratio of the giant dipole resonance energy to the pion mass. For large values of this parameter, the usual low energy theorems can be obtained, while the opposite, physical, regime leads to the one-body approach favored in most calculations. A discussion of binding effects in the Thomson (threshold photon scattering) cross section is also presented. Our conclusion is that the use of PCAC and soft pion theorems for a nucleus can be dangerous in some circumstances.

44948 Muon-decay neutrinos and limits on neutrino oscillations. Nemethy, P. (Lawrence Berkeley Lab., Berkeley, CA 94720). pp 263-270 of Gauge theories, massive neutrinos, and proton decay. Kursunoglu, B.; Perlmutter, A. New York, NY; Plenum (1981). (CONF-810134—).

From Orbis scientiae conference; Fort Lauderdale, FL, USA (19 Jan 1981).

An experiment which was intended to demonstrate whether muon conservation should be formulated additively or multiplicatively is discussed. In order to measure the branching ratios of the processes corresponding to these possibilities, the rates of γ /SUB e/ /μ^+ and γ /SUB e/ /μ^+ decay were observed. These rates would give the branching ratios directly if there were no neutrino oscillations. The author's analysis of the data indicates that it fits best with the assumption of no neutrino oscillations and additive muon conservation.

6453 Particle Invariance Principles And Symmetries

REFER ALSO TO CITATION(S) 44940, 44953

6454 Field Theory

REFER ALSO TO CITATION(S) 44903, 44935, 44939, 44942, 44944, 44945

44949 (UM-P—82/37) Algebraic description of perturbation theory in quantum electrodynamics. Wright, J.D. (Melbourne Univ., Parkville (Australia). School of Physics). 1982. 37p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701056.

An algebraic formulation of the electromagnetic field, in which various quantization procedures can be described, is used to discuss perturbation calculations. The Feynman rules and the second order calculation of the self-energy of the electron can be developed on the basis of the Fermi method of quantization. The algebraic approach clarifies the problems in defining the vacuum and other states, which are associated with calculations in terms of field algebra operators. The vacuum state defined on the field algebra by Schwinger leads to incorrect results in the self-energy calculation.

44950 Two-dimensional, steady-state diffusion of a passive scalar in a flow field. Turner, L.; Bender, C.M. (Los Alamos National Laboratory, University of California, Los Alamos, New Mexico 87545). *Journal of Mathematical Physics (New York);* **24**: No. 6, 1630-1632(Jun 1983).

The two-dimensional, steady-state equation governing the diffusion of a passive scalar field Psi, delx(uPsi) = etadel^{2}Psi, is shown to yield a set of analytic solutions for eta-independent flows u. For the case of vorticity flow, this equation can be reduced to an equation solved by Darboux. For the case of potential flow, a special class of solutions is found, of which that demonstrated by Matthaeus and Montgomery is a special case.

44951 Role of the phonon in the quantum-chromodynamical plasma. Carruthers, P. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **50**: No. 16, 1179-1180(18 Apr 1983).

It is observed that a color-neutral scalar phonon mode of velocity $\sqrt{3}$ should exist in the QCD plasma. The energy density of the phonons is $3\sqrt{3}/16$ that of noninteracting massless gluons and compensates to a considerable extent for the suppression of gluon modes due to collective plasma effects.

44952 Quarkonium bound states and coupling to hadrons. Jacobs, S.; Miller, K.J.; Olsson, M.G. (Physics Department, University of Wisconsin, Madison, Wisconsin 53706). *Physical Review Letters;* **50**: No. 16, 1181-1183(18 Apr 1983). Contract AC02-76ER00881.

An inconsistency is found involving heavy quarkonia energy levels in the usual single-channel potential picture. Coupling to the nearest hadronic channel resolves the difficulty.

44953 Four-dimensional CP^2 model on a lattice. Bitar, K.M.; Raja, R. (Fermi National Accelerator Laboratory, Batavia, Illinois 60510). *Physical Review [Section] D: Particles and Fields;* **27**: No. 8, 1894-1902(15 Apr 1983).

We investigate the phenomenon of dynamical generation of gauge interactions from CP/sup N/-1 models in four dimensions. We do this for the CP^2 model on a lattice. The phase diagram of a model that interpolates between CP^2 and U(1) gauge theory on a lattice is first mapped out. The potential between static charges in various regions of this diagram is also measured. Contrary to hopes based on the large-N behavior of similar models in two dimensions and on our phase diagram, we find that the potentials generated by CP^2 do not bear any resemblance to those of U(1). They are rather similar to the Higgs phase of an Abelian gauge theory in both phases displayed by CP^2.

44954 **Numerical studies of renormalization in SU(3) gauge theory in four dimensions.** Ardill, R.W.B.; Creutz, M.; Moriarty, K.J.M. (Department of Mathematics, Royal Holloway College, Englefield Green, Surrey TW20 0EX, United Kingdom). *Physical Review* [*Section*] *D: Particles and Fields;* **27**: No. 8, 1956-1959(15 Apr 1983). Contract AC02-76CH00016.

Wilson loops for pure SU(3) gauge theory are calculated by Monte Carlo simulations on an 8^4 lattice. Following renormalization-group arguments, Wilson loops on different length scales are compared. The only observed ultraviolet-stable fixed point lies at vanishing bare coupling. Asymptotic freedom is numerically verified.

44955 **Quasi-Abelian versus large-N/sub c/ linear confinement.** Adler, S.L.; Neuberger, H. (The Institute for Advanced Study, Princeton, New Jersey 08540). *Physical Review* [*Section*] *D: Particles and Fields;* **27**: No. 8, 1960-1961(15 Apr 1983). Contract AC02-76ER02220.

In the quasi-Abelian approximation as well as in the large-N/sub c/ limit sources in the adjoint representation cannot be screened. Nevertheless, the two phenomena are different because the string tension is proportional to the square root of the Casimir operator in the first case and to the Casimir operator itself in the second.

44956 **Exact solution of the Dirac equation in the field of a 't Hooft— p Polyakov monopole.** Marciano, W.J.; Muzinich, I.J. (Department of Physics, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review Letters;* **50**: No. 14, 1035-1037(4 Apr 1983).

This paper presents an exact solution of the Dirac equation for an $I = (1/2)$ fermion in the field of a 't Hooft—Polyakov magnetic monopole (in the Prasad-Sommerfield limit) which is analytic at $r = 0$. Helicity conservation restricts the $J = 0$ S matrix to be pure charge exchange. Because of the long-range interaction, the scattering amplitude is enhanced at long wave lengths $\lambda >> 1/M$ (the monopole structure size). The relevance of the present results for the question of proton decay catalysis is briefly discussed.

44957 **Light scalars in N=1 locally supersymmetric theories.** Gaillard, M.K.; Hall, L.J.; Zumino, B. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.; California Univ., Berkeley (USA). Dept. of Physics); del Aguila, F. (Universidad Autonoma de Barcelona (Spain). Dept. de Fisica Teorica); Polchinski, J. (Harvard Univ., Cambridge, MA (USA). Dept. of Physics); Ross, G.G. (Science Research Council, Chilton (UK). Rutherford and Appleton Labs.; Oxford Univ. (UK). Pembroke Coll.). *Physics Letters,* [*Section*] *B;* **122**: No. 5/6, 355-360(17 Mar 1983).

The coupling of supersymmetric Yang-Mills theories to supergravity generally leads to scalars acquiring tree level masses comparable to the gravitino mass. It is shown how to avoid such tree level masses. Radiative scalar masses are estimated, and provide a cutoff dependent upper bound on the gravitino mass of $O(10^6 - 10^9)$ GeV. In many models the supersymmetry violations in the particle spectrum are governed by the gravitino mass which should therefore be heavier than O(20) GeV.

44958 **Matter-antimatter transition operators: A manual for modeling.** Caswell, W.E.; Milutinovic, J. (Maryland Univ., College Park (USA)); Senjanovic, G. (Brookhaven National Lab., Upton, NY (USA)). *Physics Letters,* [*Section*] *B;* **122**: No. 5/6, 373-377(17 Mar 1983).

We generalize the previous work on neutron (nanti n) oscillations by listing all the possible operators that describe hydrogen-antihydrogen (Hanti H) transitions and double proton decay pp -> $e^+ e^+$ ($\mu^+ \mu^+$), and by computing their matrix elements in the MIT bag model. We also find a reduction in the previously listed set of nanti n transition operators. The renormalization effects and the phenomenological consequences of these operators are given. In particular, we find that the relation between Tsub(Hanti H) and Tsub(nanti n) which emerges in a class of SU(2)sub(L) x U(1)sub(Y) x SU(3)sub(c) gauge models is unaffected by strong interaction effects and is therefore almost unchanged in higher orders.

44959 **'t Hooft—Polyakov monopole near the Prasad—Sommerfield limit.** Gardner, C.L. (Center for Theoretical Physics, Laboratory for Nuclear Science and Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139). *Annals of Physics (New York);* **146**: No. 1, 129-148(Mar 1983). Contract AC02-76ER03069.

A perturbative classical monopole solution for the SO(3) gauge theory is constructed in the limit of small but non-vanishing Higgs potential. This corresponds to the limit $\mu^2/2M^2$/sub W/ = $\lambda << 1$, where μ equals the mass of the scalar particle and M/sub W/ equals the mass of the intermediate vector particles. The monopole solution and mass are found to involve non-analytic functions of λ: (λ)/sup 1/2/ and $\lambda \ln \lambda$. The monopole mass M/sub m/ is calculated to order μ^2/M/sub W/ as M/sub m/ = $(4\pi/e^2)$M/sub W/$[1+(1/2)(\mu$/M/sub W/) $+(1/2)(\mu^2/M^2$/sub W/$)\ln(\mu$/M/sub W/$)+0.7071(\mu^2/M^2$/sub W/$)]$.

44960 **Constraints from unification of interactions in a class of composite models.** Chang, C.H.; Wu, Y.S. (Institute for Advanced Study, Princeton, NJ (USA)); Zhou, B.R. (Fermi National Accelerator Lab., Batavia, IL (USA)). *Nuclear Physics* [*Section*] *B;* **212**: No. 3, 519-535(28 Feb 1983).

Constraints from the unification of non-gravitational interactions are discussed for a class of composite models of quarks and leptons with unbroken SU(N)sub(H) x SU(3)sub(c) x U(1)sub(em) interactions (H being hypercolor responsible for the binding of preons). Some new models are proposed in this connection. The minimal SU(7) unification is analyzed in detail for the case of N = 4.

44961 **Hidden-symmetry algebra for the self-dual Yang-Mills equation.** Chau, L.L. (Brookhaven National Lab., Upton, NY (USA). Physics Dept.); Ge, M.L. (Lanzhou Univ. (China). Dept. of Physics); Sinha, A. (Ohio State Univ., Columbus (USA). Dept. of Physics); Wu, Y.S. (Institute for Advanced Study, Princeton, NJ (USA)). *Physics Letters,* [*Section*] *B;* **121**: No. 6, 391-396(17 Feb 1983).

We find that the infinite-parameter hidden-symmetry algebra for the SL (N, C) self-dual Yang-Mills field is the Kac-Moody algebra sl (N, C) x C (lambda, lambda^{-1}). There is no center term for the algebra. The corresponding hidden-symmetry algebra for the real self-dual SU(N) Yang-Mills field is also derived. It is related to an infinite-dimensional symmetric space over a subalgebra su(N) x R(lambda), or can be viewed as a real form su(N) x Csub(R) (lambda, lambda^{-1}) of the complex algebra sl (N, C) x C (lambda, lambda^{-1}). A precise definition is given in the text.

44962 **Entropy of self-avoiding surfaces on the lattice.** Sterling, T. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.); Greensite, J. (California Univ., Berkeley (USA). Dept. of Physics). *Physics Letters,* [*Section*] *B;* **121**: No. 5, 345-348(10 Feb 1983).

We compute the entropy of latticized, self-avoiding planar surfaces in three dimensions, by computer simulation of surface fluctuations. Our data are consistent with the formula Nsub(S) approx.= Ssup(γeelement ofS), where Nsub(S) is the number of surfaces of area S, and $\gamma = -0.5 +- 0.05$, element of$=0.531+-0.003$. We also determine the phase structure of a field theory based on interacting surfaces, which reduces to Z_2 lattice gauge theory in the 'non-interacting' limit.

44963 **Renormalization of U(1) lattice gauge actions.** Bitar, K.M.; Gottlieb, S.; Zachos, C.K. (Fermi National Accelerator Lab., Batavia, IL (USA)). *Physics Letters, [Section] B;* **121**: No. 2/3, 163-168(27 Jan 1983).

We investigate the space of variant mixed actions of compact U(1) lattice gauge theory through the Migdal renormalization recursion technique. We map and study the phase diagrams of actions specified through charge-1 - charge-2, as well as charge-2 - charge-5. Different phases of such diagrams are characterized by signals in their renormalized actions with the distinct patterns and periodicities which typify the collective behavior of their degrees of freedom.

65 PHYSICS RESEARCH

6510 Nuclear Physics

44964 (GSI—82-8, pp 7-18) **U.S. program in heavy-ion fusion.** Bangerter, R.O. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The author presents the US program for the research on heavy ion fusion reactions. Especially the beam transport, beam focusing, and the beam-target interactions are discussed.

44965 (GSI—82-8, pp 19-32) **U.K. programme in heavy ion fusion.** King, N.M. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

The research program of Great Britain concerning heavy ion fusion reactions is described. Especially the beam transport problem including injection and focusing are discussed. Furthermore ion-ion collision problems in the targets are considered.

44966 (GSI—82-8, pp 33-49) **Present status of heavy-ion fusion study in Japan.** Hirao, Y. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

A review is given about the research on heavy ion fusion reactions in Japan. Especially the beam transport problems are discussed. Furthermore the accelerator and storage ring systems are described.

44967 (GSI—82-8, pp 50-62) **German HIF program.** Bock, R. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

A review is given about the research program on heavy ion fusion reactions in the Federal Republic of Germany. Especially the accelerators are described together with some studies on beam dynamics.

44968 **1982 Recent References (Cumulation).** Ramavataram, S. (Brookhaven National Laboratory, Upton, New York 11973). *Nuclear Data Sheets;* **37**: No. 1, 1-203(Sep 1982). Contract W-7405-ENG-26;AC02-76CH00016.

Keywords and references are given for all literature received by National Nuclear Data Center during 1982. (AIP)

6512 Nuclear Properties And Reactions, A=1-5

44969 **(CONF-830862—1) Relativistic effects in the binding energies of few-body nuclei.** Coester, F.; Wiringa, R.B. (Argonne National Lab., IL (USA)). 1983. Contract W-31-109-ENG-38. 2p. NTIS, PC A02/MF A01. Order Number DE83014711.

From 10. international conference on few-body problems in physics; Karlsruhe, F.R. Germany (21 Aug 1983).

We have examined the consequences of Poincare invariance for the binding-energy calculations of few-body nuclei. Nonrelativistic Hamiltonians have been considered in an attempt to fit simultaneously the binding energies of 2-, 3-, 4-body nuclei and that of nuclear matter. Even with reasonable three-body forces it appears to be difficult to simultaneously fit the binding energies of 3- and 4-body nuclei. The size of the discrepancy is of the order of possible relativistic effects. After elimination of the center-of-mass motion the two-body Schroedinger equation can always be interpreted as a relativistic equation. Given a two-body mass operator (i.e. a two-body Hamiltonian for zero total momentum) it is possible to construct a consistent relativistic multi-body dynamics with a nonrelativistic limit. The relativistic effects can be calculated in first-order perturbation theory using an expansion in inverse powers of the nucleon mass.

44970 **Conventional approach to the problem of the deuteron smearing corrections.** Kusno, D.; Moravcsik, M.J. (Department of Physics, Faculty of Mathematics and Sciences, University of Indonesia, Jakarta, Indonesia). *Physical Review [Section] C: Nuclear Physics;* **27**: No. 5, 2173-2191(May 1983). Contract AM06-76RL02230.

A comprehensive analysis of the problem of deuteron smearing corrections is given. Some problems of the usual approach (the conventional approach) are discussed. It is shown that the formalism adopted by this approach leads to (i) the existence of the so-called West β correction and (ii) the disagreement of the sum rules with the quark parton model expectations in leptonic scattering. It is also shown that in this formalism the electroproduction expression is not inconsistent. Following West for the identification of the wave function, it is found that the smearing correction σ/sub s/ of the high-energy (50—370 GeV) pion and nucleon process is non-negligible, and hence, in contradiction with the usual expectations. Another test for this approach is suggested.

44971 **Isospin mixing in the ^{4}He giant dipole resonance.** Bevelacqua, J.J. (United States Department of Energy, Oak Ridge, Tennessee 37830). *Physical Review [Section] C: Nuclear Physics;* **27**: No. 5, 2417(May 1983).

The addition of a new (1^-,0) level at 29 MeV excitation energy in ^{4}He to the level spectrum of Fiarman and Meyerhof leads to a calculated ^{4}He(γ,p) to ^{4}He(γ,n) cross section ratio of 1.67. The calculated ratio falls within the experimental range of 1.6—1.9 without utilizing charge symmetry violating forces.

44972 **Electric polarizability of the deuteron.** Friar, J.L.; Fallieros, S.; Tomusiak, E.L.; Skopik, D.; Fuller, E.G. (Theoretical Divison, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] C: Nuclear Physics;* **27**: No. 3, 1364-1366(Mar 1983).

An experimental value of the electric polarizability of the deuteron is extracted from deuteron photoabsorption data, a dispersion relation, and the low-energy theorem for Compton scattering. The experimental number requires the calculation of several small corrections, which are primarily magnetic in origin. Our value is somewhat smaller than, but consistent with, a recently reported experimental determination.

44973 **Time asymmetry: Polarization and analyzing power in the nuclear reactions.** Rioux, C.; Roy, R.; Slobodrian, R.J. (Laval Univ., Quebec City (Canada). Lab. de Physique Nucleaire); Conzett, H.E. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). *Nuclear Physics [Section] A;* **394**: No. 3, 428-444(28 Feb 1983). (In French).

Measurements of the proton polarization in the reactions ^{7}Li(^{3}He, p vector)^{9}Be and ^{9}Be(^{3}He, p vector)^{11}B and of the analyzing powers of the inverse reactions, initiated by polarized protons at the same c.m. energies, show significant differences which imply the failure of the polarization-analyzing-power theorem and, prima facie, of time-reversal invariance in these reactions. The reaction ^{2}H(^{3}He, p vector)^4 He and its inverse have also been investigated and show some smaller differences. A discussion of the instrumental asymmetries is presented.

6513 Nuclear Properties And Reactions, A=6-19

REFER ALSO TO CITATION(S) 44973, 45034

44974 (DOE/ER/71001—T1) Final report on total cross section measurements. (Montana Univ., Missoula (USA)). 1983. Contract AT06-76ER71001. 4p. NTIS, PC A02/MF A01. Order Number DE83014577.

The total pion cross section measurements were the result of a collaborative effort of scientists from a number of laboratories. Three data runs were made using π^+ and π^- mesons from the Low-Energy Pion Channel. Statistical accuracies of one percent or more were obtained for most of the elements measured. The targets and energies measured were: ^{4}He 23 to 90 MeV; ^{12}C and ^{13}C 23 to 240 Mev, ^{6}Li, ^{9}Be, ^{10}B, ^{11}B, 43 to 215 MeV; ^{16}O, ^{18}O, ^{40}Ca, ^{44}Ca, ^{48}Ca 43 to 240 MeV; ^{45}Sc, ^{51}V 60 to 240 MeV; ^{27}Al, Cu, Sn, Ho and Pb 60 to 215 MeV. (WHK)

44975 (LA-UR—83-1746) High resolution studies of pion-nucleus reaction mechanism. Morris, C.L. (Los Alamos National Lab., NM (USA)). 1983. Contract W-7405-ENG-36. 15p. (CONF-830588—3). NTIS, PC A02/MF A01. Order Number DE83014121.

From Delta-Nucleus dynamics symposium; Argonne, IL, USA (2 May 1983).

Pion inelastic scattering is generally well described as a first order process using the DWIA. This is especially true for a large body of inelastic scattering data to low-lying collective states which is well-described by form factors obtained in (e,e') and the DWIA. Some data for which this model does not work are presented. Higher order reaction mechanisms have been invoked to explain some of these data. However, no model of these second order processes gives a satisfactory explanation of the entire data set. Experimentally, more data for pion-induced transitions to low-spin unnatural-parity states which have been studied by other probes would be useful in sorting out the reaction mechanisms responsible for the anomalous cross sections observed for the 1^+ states in ^{12}C. Theoretically, a consistent evaluation of possible second-order diagrams in inelastic scattering, such as is being attempted for DCX[23], would be useful.

44976 (LUIP—8206) Correlations between projectile and target break-up in intermediate and high energy heavy ion collisions. Herrstroem, N.-Y.; Kullberg, R.; Oskarsson, A.; Otterlund, I. (Lund Univ. (Sweden). Dept. of Cosmic and Subatomic Physics). Aug 1982. 23p. (LUNFD6/NFFK—7019/1-21(1982)). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701059.

^{16}O induced reactions in nuclear emulsion have been studied at three different energies 75, 175 and 2000 MeV/A. The probability that the projectile is completely destroyed increases significantly with increasing beam energy. The charge sum of projectile fragments ($Z>2$) shows a strong odd-even effect favouring even values. Projectile fragments are strongly slowed down at 75 MeV/A, while at 175 MeV/A the result is consistent with 2.1 GeV/A fragmentation data. The downshift in rapidity increases with decreasing impact parameter. The transverse momenta of projectile fragments are larger at 75 MeV/A than at higher energies, showing important deflections in the Coulomb field. The target disintegration depends on the transverse momentum of the projectile fragment.

44977 (UCRL—89336) Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements. Woodworth, J.G.; August, R.A.; Robertson, N.R.; Tilley, D.R.; Weller, H.R.; Jury, J.W. (Lawrence Livermore National Lab., CA (USA); Triangle Universities Nuclear Lab., Durham, NC (USA); Trent Univ., Peterborough, Ontario (Canada)). May 1983. Contract W-7405-ENG-48. 8p. (CONF-830598—2). NTIS, PC A02/MF A01. Order Number DE83014842.

From RCNP symposium on light ion reaction mechanism; Osaka, Japan (16 May 1983).

Portions are illegible in microfiche products.

Cross section, angular distribution and analyzing power measurements show structure and interference effects in neutron, proton and deuteron capture into the A = 13 system at about 20 MeV excitation energy. By introducing a secondary doorway state at 20.6 MeV with a 0.5 MeV width it is possible to explain the shape of the ^{12}(n,γ_0)^{13}C and ^{12}C(p,γ_0)^{13}N cross sections as well as the fluctuations observed in the experimental angular distributions and analyzing powers.

44978 Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations. Snover, K.A.; Adelberger, E.G.; Ikossi, P.G.; Brown, B.A. (Nuclear Physics Laboratory, University of Washington, Seattle, Washington 98195). *Physical Review [Section] C: Nuclear Physics;* 27: No. 5, 1837-1865(May 1983).

We have measured excitation functions of the γ rays resulting from the bombardment of ^{15}N by polarized and unpolarized protons in the energy range E/sub p/ = 2.5—9.5 MeV with emphasis on identifying dipole decays to the first (0^+) and second (3^-) excited states in ^{16}O. Resonances in γ_{12} are observed at E/sub x/ = 16.21, 16.45, 16.82, 17.12, 18.03, 18.98, 19.90, and 20.41 MeV. The 16.21 and 17.12 MeV resonances in γ_{12} are identified as M1 decays of the 1^+ T = 1 states to the 6.05 MeV 0^+ state in ^{16}O. The measured ratio of reduced strengths B(M1,γ_1)/B(M1,γ_0) is 0.48 +- 0.03 for decays from the 16.21 MeV state and 0.55 +- 0.04 for decays from the 17.12 MeV state. The 18.03 MeV resonance is due to a 3^- T = 1 state in ^{16}O with a strength Γ/sub p/Γ2/Γ = (1.96 +- 0.27) eV and the 18.98 MeV resonance is due to the 4^- T = 1 stretched particle-hole state with a strength of (0.85 +- 0.10) eV. We determine absolute particle and γ widths for these states. The M1 γ_2 width of the 18.98 MeV state, (7.1 +- 3.1) eV, is in agreement with a shell-model calculation. Resonances in γ_3 are observed at 16.82 and 17.27 MeV and in γ_4 at 17.88 MeV. The excitation energies and widths of these levels as well as the strengths of the γ transitions suggest a T = 1 character for all of the resonances for which capture γ rays are observed. Correspondences of our resonances to levels in ^{16}N are given. Strong α_1 branches for many of these states indicate isospin impurities. We compare γ widths, including ground-state M1 decays, and allowed β transition rates in A = 16 nuclei with shell model calculations and obtain rough agreement with the experimental results. Additional shell model calculations for M1 and Gamow-Teller decays in the A = 14, 15, 17, and 18 nuclei are presented.

44979 Microscopic formalism for intermediate energy transfer reactions: Application to the (p,d) and (d,p) reactions. Ludeking, L.D.; Vary, J.P. (Physics Department, Indiana University, Bloomington, Indiana 47401). *Physical Review [Section] C: Nuclear Physics;* 27: No. 5, 1967-1987(May 1983).

Using a multiple scattering framework we construct a variant of the usual distorted-wave Born appG5*4*E*-** transition matrix for stripping and pickup reactions. An alternative to the local energy approximation is derived which in the appropriate limit gives the commonly used zero range approximation for (p,d) and (d,p) reactions. Model calculations are developed in an eikonal framework and an examination of the sensitivity and energy dependence of the nuclear response function is made, using the ^{12}C(p,d)^{11}C(3/2$^-$, g.s.) process.

44980 Diffractive angular distribution for ^{16}O(π^+, π^-)^{16}Ne(g.s.). Greene, S.J.; Cottingame, W.B.; Burleson, G.R.; Bland, L.C.; Gilman, R.; Fortune, H.T.; Morris, C.L.; Holtkamp, D.B.; Moore, C.F. (New Mexico State University, Las Cruces, New Mexico 88003). *Physical Review [Section] C: Nuclear Physics;* 27: No. 5, 2375-2376(May 1983).

The 164-MeV angular distribution for the non-analog double charge exchange reaction ^{16}O(π^+, π^-)^{16}Ne(g.s.) has been measured and is found to be basically diffractive. This is contrasted with the previously measured analog distribution ^{18}O(π^+, π^-)^{18}Ne (double isobaric analog) which is not diffractive.

44981 Observation of a quasideuteron component in the reaction ^{12}C(π^+,2p). Altman, A.; Piasetzky, E.; Lichtenstadt, J. (Physics Department, Tel Aviv University, Ramat Aviv, Tel Aviv, Israel). *Physical Review Letters;* 50: No. 16, 1187-1190(18 Apr 1983). Contract W-31-109-ENG-38.

The reaction $^{12}C(\pi^+,2p)$ was studied at 165 and 245 MeV over a broad kinematic range by coincidence measurement of the outgoing protons. The p-p angular correlations and proton energy spectra allow an identification of the "quasideuteron" component of the reaction. The angular distribution of this component has a shape similar to that of the $\pi^+ d \rightarrow pp$ reaction. It is found that one-step quasideuteron absorption accounts for at most 25% of the total absorption cross section.

44982 Anomalous reaction mean free paths of nuclear projectile fragments from heavy ion collisions at 2A GeV. Friedlander, E.M.; Gimpel, R.W.; Heckman, H.H.; Karant, Y.J.; Judek, B.; Ganssauge, E. (Nuclear Science Division, Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1489-1520(Apr 1983).

We present in detail the description and the analysis of two independent experiments using beams of ^{16}O and ^{56}Fe. From their results it is concluded that the reaction mean free paths of relativistic projectile fragments, 3< or =Z< or =26, are shorter for a few centimeters after emission than at large distances, where they are compatible with values predicted from experiments on beam nuclei. The probability that this effect is due to a statistical fluctuation is $<10^{-3}$. The effect is enhanced in later generations of fragments, the correlation between successive generations suggesting a kind of "memory" for the anomaly. Various systematic and spurious effects as well as conventional explanations are discussed, mainly on the basis of direct experimental observations internal to our data, and found not to explain our results. The data can be interpreted by the relatively rare occurrence of anomalous fragments that interact with an unexpectedly large cross section. The statistical methods used in the analysis of the observations are fully described.

44983 Diffraction theory and the double-charge-exchange reaction $^{18}O(\pi^+,\pi^-)$ ^{18}Ne. Liu, L.C. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1611-1620(Apr 1983). Contract W-7405-ENG-36.

The angular distribution and the excitation function of the reaction $^{18}O(\pi^+,\pi^-)$ ^{18}Ne (double isobaric analog state) can be well understood in the framework of a coupled-channel diffractive scattering theory provided we include higher-order processes. Use of a scaling theory allows an essentially parameter-free calculation of these processes and makes possible the study of effects arising from finer aspects of nuclear structure such as the core excitation of ^{18}O.

44984 Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction. Martoff, C.J.; Bistirlich, J.A.; Clawson, C.W. (Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1621-1635(Apr 1983).

Photon spectra from radiative capture of stopped negative pions captured by ^{13}C and ^{19}F nuclei have been measured with a high resolution pair spectrometer. In the bound region transitions have been observed to ^{13}B(g.s.), ^{13}B(3.5 MeV), ^{19}O(g.s.), ^{19}O(4.9 MeV), and ^{19}O(6.3 MeV). In addition, strong transitions to narrow states above the neutron separation threshold were observed in both cases. The results for ^{13}C are in agreement with detailed shell model calculations of this process. Major strength is observed for states formed by coupling extra nucleons or holes to the spin-quadrupole d/sub 5/2/ and d/sub 3/2/, J/sup π/ = 2^- states in ^{16}O. The $^{13}C(\pi^-,\gamma)^{13}B$/sub g.s./ branching ratio is shown to be consistent with beta decay and electroexcitation data, through a combined phenomenological analysis. The observed transition strengths are accounted for by matrix elements of the spin-density operators $[\sigma \times Y_0]^1 t^+$ and $[\sigma \times Y_1]t^+$.

44985 Inelastic scattering of 162-MeV pions by ^{14}N. Geesaman, D.F.; Kurath, D.; Morrison, G.C. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1134-1145(Mar 1983). Contract W-31-109-ENG-38.

The inelastic scattering of 162-MeV pions by ^{14}N has been studied over the angular range 35° to 115° in the laboratory system. The data were analyzed with a model which incorporates shell model wave functions into a distorted wave impulse approximation. Reduced transition probabilities obtained for a number of low-lying states are compared to previous data to validate the model. Among new assignments and shell model descriptions presented for several higher excited states is an assignment for the yrast 5^- state.

44986 Production of positive pions by 800 MeV protons on carbon. Denes, P.; Dieterle, B.D.; Wolfe, D.M.; Bowles, T.; Dombeck, T.; Simmons, J.E.; Bhatia, T.S.; Glass, G.; Tippens, W.B. (Department of Physics and Astronomy, The University of New Mexico, Albuquerque, New Mexico 87131). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1339-1341(Mar 1983).

The double differential cross section for the reaction $p+C \rightarrow \pi^+ + X$ has been measured at laboratory angles of 7°, 15°, 20°, and 30°.

44987 $0^+ \rightarrow 0^-$ beta decay of ^{16}C. Gagliardi, C.A.; Garvey, G.T.; Jarmie, N.; Robertson, R.G.H. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1353-1355(Mar 1983). Contract W-31-109-ENG-38.

The beta decay of ^{16}C to $^{16}N(0^-, 120$ keV) has been observed. The branching ratio is (0.68/sub -0.11//sup +0.09/%) and the $\log f_0 t$ = 6.70/sub -0.05//sup +0.07/. The rate of this $0^+ \rightarrow 0^-$ transition is dominated by the time component of the axial-vector current, which is expected to receive a large enhancement from pion-exchange currents. An upper limit of <0.1% has also been set for the beta-decay branching ratio to $^{16}N(1^-, 398$ keV).

44988 Structure of ^{12}B from measurement and R-matrix analysis of sigma(theta) for $^{11}B(n,n)^{11}B$ and $^{11}B(n,n')^{11}B$su p(*)(2.12 MeV), and shell-model calculations. Koehler, P.E.; Knox, H.D.; Resler, D.A.; Lane, R.O. (Ohio Univ., Athens (USA). John E. Edwards Accelerator Lab.); Millener, D.J. (Brookhaven National Lab., Upton, NY (USA)). *Nuclear Physics* [*Section*] *A;* **394**: No. 1/2, 221-244(Feb 1983).

Differential cross sections for neutrons, elastically scattered from ^{11}B and inelastically scattered to the first excited state $^{11}B^*$(2.12 MeV) have been measured at 13 incident energies for 4.8 <= Esub(n) <= 7.6 MeV corresponding to excitation energies in ^{12}B of 7.8 to 10.3 MeV. The cross sections were measured at nine laboratory angles per energy from 20° to 160° and show considerable resonance structure. Differential inelastic cross sections were also measured for the 4.45 and 5.02 MeV levels of ^{11}B for 2 to 9 angles at several incident energies. These new elastic and inelastic 2.12 MeV level data have been analyzed together with previously publsihed cross sections for 2 <= Esub(n) <= 7.5 Mev using a multilevel-multichannel R-matrix program to determine J, π, Esub(lambda) and ysub(lambdac) for states in ^{12}B. The shell model was used to calculate states in ^{12}B as well as spectroscopic amplitudes for reactions leading to these states. The results of this model calculation are compared to those of the R-matrix analysis. Much of the structure observed in the experimental work is predicted by the model for Esub(x) < or approx. 7 MeV. For levels of higher excitation the agreement is not as good. The experimental data are also compared to continuum shell-model calculations.

6514 Nuclear Properties And Reactions, A=20-38

REFER ALSO TO CITATION(S) 44974, 45034

44989 Energy deposition in intermediate-energy nucleon-nucleus collisions. Kwiatkowski, K.; Zhou, S.H.; Ward, T.E.; Viola, V.E. Jr.; Breuer, H.; Mathews, G.J.; Goekmen, A.; Mignerey, A.C. (Indiana University Cyclotron Facility and Department of Chemistry, Indiana University, Bloomington, Indiana 47405). *Physical Review Letters;* **50**: No. 21, 1648-1651(23 May 1983). Contract AC02-81ER40007.

A global study of the mass, energy, and angular distributions of all products formed in collisions of 180-MeV protons with ^{27}Al is reported. These data are compared with calculations based on intranuclear-cascade-plus-evaporation, preequilibrium hybrid, and semiempirical models. It is found that there is evidence for enhanced

energy deposition in nucleon-nucleus collisions relative to predictions of intranuclear cascade calculations. In contrast, preequilibrium calculations produce stronger energy damping, more consistent with observed data.

44990 **Calculation of the energy-averaged scattering function from high resolution low-energy neutron scattering data.** Johnson, C.H.; Larson, N.M.; Mahaux, C.; Winters, R.R. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 1913-1926(May 1983).

The elastic scattering neutron cross section at low energy displays many narrow resonances. By definition, the optical-model scattering function is equal to a suitable energy average of the actual scattering function. This average should be independent of the particular representation chosen for parametrizing the actual scattering function and also fairly independent of the averaging weight function. In particular, it should be fairly independent of the width of the weight function, even though a sparsity of resonances might require the width to be comparable to the energy range of the measurements. It is shown by direct numerical calculations of the average that this holds in the example of the scattering of p/sub 3/2/ neutrons by ^{32}S. Attention is drawn to pitfalls which exist when this average is evaluated analytically from parametrized forms of the scattering function. Several ways of graphically representing or of parametrizing the average scattering function are illustrated and discussed.

44991 **Optical potential description of ^{16}O+^{28}Si elastic scattering.** Kobos, A.M. (Oxford Univ. (UK). Nuclear Physics Lab.; Open Univ., Milton Keynes (UK). Dept. of Physics); Satchler, G.R. (Oak Ridge National Lab., TN (USA)); Mackintosh, R.S. (Open Univ., Milton Keynes (UK). Dept. of Physics). *Nuclear Physics* [*Section*] *A;* **395**: No. 1, 248-262(7 Mar 1983).

The differential cross sections for ^{16}O + ^{28}Si elastic scattering at seven energies between 21 and 35 MeV in the centre of mass are described well over the whole angular range from 20° to 180° by an optical potential whose real part consists of a double-folded potential supplemented by a phenomenological model-independent correction term. This surface correction is predominantly attractive and has structure which depends only weakly on the energy. The associated imaginary potentials imply surface transparency and have detailed structure which varies rapidly with energy. However there is a systematic trend for the absorptive region to extend to larger radii as the energy increases. A simple parametrization of this trend allows the main features of the excitation function for 180° scattering to be produced.

44992 **Alpha capture into the giant quadrupole resonance in ^{28}Si.** Kuhlmann, E.; Snover, K.A.; Feldman, G.; Hindi, M. (Institut fuer Experimentalphysik I, Ruhr-Universitaet Bochum, D4630 Bochum, Federal Republic of Germany). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 948-959(Mar 1983).

Angular distributions have been studied in the ^{24}Mg(α,γ_0) ^{28}Si reaction in fine energy steps for excitation energies 14< or ≈E/sub x/< or ≈22 MeV. Absolute cross sections were determined with errors smaller than 10% and were found to be substantially lower than previously determined. A total E2 strength of (3.7 +- 0.4) % of the energy weighted sum rule was observed, in good agreement with results obtained from ($\alpha,\alpha'\alpha_0$) coincidence experiments. Strong interference effects as well as other deviations from statistical model expectations are interpreted as due to nonstatistical preequilibrium effects in both E1 and E2 channels.

44993 **Photoneutron cross sections for the silicon isotopes.** Pywell, R.E.; Berman, B.L.; Jury, J.W.; Woodworth, J.G.; McNeill, K.G.; Thompson, M.N. (Accelerator Laboratory, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 0W0). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 960-975(Mar 1983).

The photoneutron cross sections for ^{28}Si, ^{29}Si, and ^{30}Si have been measured up to 33 MeV with monoenergetic photons from the annihilation in flight of fast positrons, using neutron multiplicity counting. Average neutron energies were obtained simultaneously with the cross-section data by the ring-ratio technique. The giant dipole resonances for ^{29}Si and ^{30}Si exhibit appreciable fragmentation; that for ^{28}Si does not. The (γ,2n) cross section for ^{29}Si is large; that for ^{28}Si is consistent with zero. The (γ,1n) cross section for ^{30}Si decreases sharply with energy to values near zero as the (γ,2n) cross section grows, then increases to appreciable values as the (γ,2n) cross section diminishes; this extreme behavior, although never seen before, is attributable to the competition between the (γ,n), (γ,2n), and (γ,pn) decay channels. Some properties of the isospin components of the giant resonance are inferred. Other features of the data, including the integrated cross sections, are found to be similar in many respects to corresponding results for the oxygen and magnesium isotopes. The ^{28}Si nucleus is found to be a better "core" for ^{29}Si and ^{30}Si than might have been expected from previous descriptions of its open-shell character.

44994 **^{34}Cl superallowed β decay.** Raman, S.; Jurney, E.T.; Outlaw, D.A.; Towner, I.S. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1188-1198(Mar 1983).

The neutron separation energy of ^{34}S and the proton separation energy of ^{34}Cl have been measured accurately via the ^{33}S(n,γ)^{34}S and the ^{33}S(p,γ)^{34}Cl reactions. The measured values imply a Q value of 5492.48 +- 0.20 keV for the total decay energy of ^{34}Cl if the calibration is based on the "mass doublet standard" and a Q value of 5492.42 +- 0.23 keV if based on the 411.8044 +- 0.0011 keV line in ^{198}Au. If the conserved vector current hypothesis is valid and the electromagnetic corrections are made properly, the ft values for superallowed $0^+\rightarrow 0^+$ β decays should all be the same. The ft values for the superallowed ^{34}Cl and ^{14}O decays were found to be equal to better than (4 +- 16) parts in 10^4, in agreement with the expectations.

6515 Nuclear Properties And Reactions, A=39-58

REFER ALSO TO CITATION(S) 44982, 45034

44995 (INIS-SU—109, pp 296-300) **Analysis of the recommended threshold reaction cross sections from the BOSPOR-80 library using integral experiment data.** Bychkov, V.M.; Zolotarev, K.I.; Pashchenko, A.B.; Plyaskin, V.I. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.:. 1980. (In Russian). NTIS (US Sales Only), PC A15/MF A01. (CONF-8009198—Pt.3).

From 5. national Soviet conference on neutron physics; Kiev, Ukrainian SSR (15 Sep 1980).

The comparative analysis of the recommended microscopic cross sections for ^{56}Fe(n,p) ^{56}Mn and ^{58}Ni(n,p)^{58}Co reactions is performed according to data of the ENDF/B-4, UKNDL and BOSPOR-80 libraries. The analysis is realized on the base of the results of differential and integral experiments carried out at the PF-4 critical assembly with uranium-hydride zirconium core. The investigation carried out shows that neutron spectra restored using data on cross section of the ^{58}Ni(n,p)^{58}Co reaction from BOSPOR-80 and ENDF/B-4 libraries give minimum deflections of the measured spectrum. When using UKNDL library data the restored spectrum values turn to be lower than the experimental data. For the ^{56}Fe(n,p)^{56}Mn reaction the restored neutron spectra obtained using data from all the three libraries agree well between themselves and with the experiment results.

44996 **Dirac-equation impulse approximation for intermediate-energy nucleon-nucleus scattering.** Clark, B.C.; Hama, S.; Mercer, R.L.; Ray, L.; Serot, B.D. (Department of Physics, The Ohio State University, Columbus, Ohio 43210). *Physical Review Letters;* **50**: No. 21, 1644-1647(23 May 1983).

In this application of Dirac phenomenology a relativistic impulse approximation is used to describe proton-nucleus elastic scattering at intermediate energies. The results demonstrate the superiority of this relativistic treatment over the nonrelativistic impulse approximation, especially with regard to spin observables. The method has important implications with respect to the extraction of neutron distributions.

44997 **Observation of analog and nonanalog transitions in the reaction $^{56}Fe(\pi^+,\pi^-)^{56}Ni$.** Seidl, P.A.; Kiziah, R.R.; Brown, M.K. (University of Texas at Austin, Austin, Texas 78712). *Physical Review Letters;* **50**: No. 15, 1106-1109(11 Apr 1983).

An excitation function for the reaction $^{56}Fe(\pi^+,\pi^-)^{56}Ni$ has been measured at θ/sub lab/ = 5° for incident pion energies of 140—290 MeV. The transition to the lowest-lying T = 0 state is similar to previous observations, but that to the lowest-lying T = 2 state is not, except in the high-energy range.

44998 **"Wine-bottle" optical potentials and the inelastic scattering of protons near 200 MeV.** Satchler, G.R. (Oak Ridge National Lab., TN (USA)). *Nuclear Physics* [*Section*] *A;* **394**: No. 3, 349-359(28 Feb 1983).

The effects on inelastic proton scattering of using potentials with non-standard 'wine-bottle' shapes are studied. Several wine-bottle potentials are found which give elastic scattering equivalent to that obtained from a conventional Woods-Saxon potential, and the inelastic scattering is calculated. There are large reductions (as much as a factor of two) in the predicted cross sections for exciting ^{40}Ca, smaller reductions for ^{208}Pb. When the deformed optical potential model is used, roughly one-half of the effect is due to the changes in the transition potential and one-half to the use of different distorted waves.

44999 **Study of the sup(39,41)K(d,^{3}He)sup(38,40)Ar reactions at 22.8 MeV.** Bhat, C.M.; Rajo Rao, M.; Puttaswamy, N.G. (Bangalore Univ. (India). Dept. of Physics); Yntema, J.L. (Argonne National Lab., IL (USA)). *Nuclear Physics* [*Section*] *A;* **394**: No. 1/2, 109-117(Feb 1983).

The sup(39, 41)K(d, ^{3}He)sup(38,40)Ar reactions have been investigated at Esub(d) = 22.8 MeV to study the low-lying positive-parity levels in ^{38}Ar and ^{40}Ar. The transitions to fourteen levels in the residual nuclei have been analysed with distorted wave Born approximation calculations. The spectroscopic strengths for proton pickup to the levels in ^{40}Ar are reported here for the first time. The experimental results are compared with recent shell-model calculations.

6516 Nuclear Properties And Reactions, A=59-89

45000 **(LUIP—8207) Calendar of high multiplicity ^{12}C induced reactions in Ag (Br).** Jakobsson, B.; Joensson, G.; Lindkvist, B.; Oskarsson, A. (Lund Univ. (Sweden). Dept. of Cosmic and Subatomic Physics). May 1982. 66p. (LUNFD6/NFFK—7020/1-3(1982)). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701058.

A calendar is given of 73 high multiplicity events in nuclear emulsion. The events show interactions of ^{12}C induced in Ag(Br). The energies of the colliding ^{12}C-nuclei are 55A MeV < E < 110A MeV.

45001 **Collective excitations of ^{82}Kr observed by in-beam and decay spectroscopy and their characterization by the interacting boson model.** Meyer, R.A.; Wild, J.F.; Eskola, K.; Leino, M.E.; Vaeisaelae, S.; Forssten, K.; Kaup, U.; Gelberg, A. (Nuclear Chemistry Division, Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2217-2238(May 1983).

A comprehensive investigation of the excited states of ^{82}Kr has been carried out through the γ-ray spectroscopy study of the radioactive decay of ^{82}Br/sup g/ (t/sub 1/2/ = 35.3 h, J/sup π/ = 5$^-$), ^{82}Br/sup m/ (t/sub 1/2/ = 6.1 min, J/sup π/ = 2$^-$), ^{82}Rb/sup g/ (t/sub 1/2/ = 1.273 min, J/sup π/ = 1$^+$), and ^{82}Rb/sup m/ (t/sub 1/2/ = 6.2 h, J/sup π/ = 5$^-$) and in-beam studies using the $^{80}Se(\alpha,2n\gamma)^{82}Kr$ reaction. We use the ^{82}Kr level structure we determined, to test the interacting boson model. We show that the interacting boson model calculation can account for the observed levels below 3 MeV provided the underlying shell structure is taken into account. A low energy four quasiparticle ν{p/sub 1/2/ (g/sub 9/2/)^3/sub 7/2/}4$^-$ band is proposed and its mixing with the octupole band is discussed.

6517 Nuclear Properties And Reactions, A=90-149

REFER ALSO TO CITATION(S) 44974, 45000, 45026, 45026

45002 **(FEI—1229) Ensuring by multigroup constants for calculations of photoneutron sources.** Kulagin, N.T.; Surnin, A.F. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.). 1981. 15p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702086.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 2 tabs.

The problem of constant ensuring for calculation of photoneutron sources by a present spatial-energy distribution of gamma quanta flow density in the multigroup approximation is considered. For its solution a library of data on energy dependence of photonuclear reaction cross sections is suggested. This library is recorded at the VU computer in the same format as the BNG4/A ARAMAKO-G complex library which enables one to use for obtaining photonuclear reactions group cross sections the complex programs but with a small expansion. The contents of libraries on photonuclear reaction cross sections in the EXFOR and BGL/A formats is given.

45003 **Population of ^{133}I from the beta decay of fission product ^{133}Te/sup g/ and the cluster-vibration model.** Hicks, H.G.; Landrum, J.H.; Henry, E.A.; Meyer, R.A.; Brandt, S.; Paar, V. (Lawrence Livermore National Laboratory, Livermore, California 94550). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2203-2216(May 1983).

An automated rapid chemistry system has been used to isolate enriched sources of 12.4-min ^{133}Te /sup g/ from mixed fission products via the sequence $^{133}Sb(\beta)^{133}Te$ /sup g/. In addition, pure sources of ^{133} Te/sup g/ were obtained by using the reduction of Te/sup VI/ to Te/sup IV/ during the isomeric decay of ^{133}Te/sup m/. Singles, Compton suppression singles, and γ-γ coincidence Ge(Li) spectra were used to identify approximately 210 γ rays from the decay of ^{133}Te/sup g/. This information was used to establish 38 levels below 3000 keV in ^{133}I. Cluster-vibration model calculations have been carried out for the Z = 53 nucleus ^{133}I. The calculated level structure and transition probabilities are found to be in good agreement with the experimental results.

45004 **Observation of the nuclear isovector monopole resonance.** Bowman, J.D.; Baer, H.W.; Bolton, R. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **50**: No. 16, 1195-1198(18 Apr 1983).

Observation of the T+1 component of the isovector monopole and the giant dipole resonances in the reactions ^{90}Zr and $^{120}Sn(\pi^-,\pi^0)$ at T- = 165 MeV is reported. The isobaric analog state and T-1 component of the giant dipole resonance in the reaction $^{120}Sn(\pi^+,\pi^0)$ were also observed. Excitation energies and widths of the monopole are given.

45005 **Excited states of ^{96}Ru.** Walkiewicz, T.A.; Raman, S.; McGrory, J.B. (Edinboro State College, Edinboro, Pennsylvania 16444). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1710-1723(Apr 1983).

The nuclear excited states of ^{96}Ru were studied by means of the decays of 9.25-min and 1.55-min ^{96}Rh isomers, and the $^{93}Nb(^6Li, 3n\gamma)$ reaction. Approximately 140 γ rays measured in these experiments were incorporated into a level scheme consisting of approximately 50 excited states. The experimental level scheme is compared with a level scheme calculated on the basis of the shell model.

45006 **Beta-decay energies and masses of $^{103-105}In$.** Wouters, J.M.; Thierens, H.M.; Aystoe, J.; Cable, M.D.; Haustein, P.E.; Parry, R.F.; Cerny, J. (Department of Chemistry and Lawrence Berkeley Laboratory, University of California, Berkeley, California 94720). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1745-1753(Apr 1983). Contract W-7405-ENG-48.

Decay energies of $^{100-106}$In have been determined by β-γ coincidence spectroscopy on sources obtained from an on-line mass separator. Comparisons of the measured decay energies and deduced masses are made with the predictions of several different theoretical models. The ^{103}In mass is found to be more bound by 1 MeV than predicted by most models, which reproduce adequately the masses of the heavier indium isotopes. Systematic trends of the masses and neutron separation energies of the indium isotopes between the closed N = 50 and 82 shells are presented.

45007 **Excitation functions of the ^{127}I(π,πxn) reactions in the region of the (3,3) resonance.** Ohkubo, Y.; Porile, N.T.; Orth, C.J.; Liu, L.C. (Department of Chemistry, Purdue University, West Lafayette, Indiana 47907). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1146-1161(Mar 1983).

Excitation functions have been determined for the formation of ten iodine nuclides (^{117}I— ^{126}I) in the interaction of 60—350 MeV π^+ and π^- with ^{127}I. The contribution of various reaction mechanisms has been estimated from the systematic features of the excitation functions and isotopic yield distributions with the aid of cross sections obtained for the production of various isobaric xenon nuclides, cross-section results for 500 MeV proton bombardment of ^{127}I, and comparison with Monte Carlo cascade-evaporation calculations. It is found that, with varying importance, mechanisms involving direct neutron knockout, pion inelastic scattering plus evaporation, pion absorption, and pion charge exchange contribute to the observed yields.

45008 **Nuclear structure of the low lying levels of ^{147}Eu from γ-γ directional correlation measurements on ^{147}Eu.** Shastry, S.; Burman, C.; Bakhru, H.; Jones, B.; Shinbrot, M. (Physics Department, State University of New York, College of Arts and Science, Plattsburgh, New York 12901). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1284-1295(Mar 1983).

The nuclear structure of the low lying levels of the transitional nucleus ^{147}Eu, from ^{147}Gd decay, has been investigated by γ-γ directional correlation experiments using a Ge(Li)-Ge(Li) fast coincidence arrangement. From the measurements on the 396-229.3, 549.5-229.3, 632.8-229.3, 766.0-229.3, 893.4-229.3, 1006.6-229.3, 1131.0-229.3, 1325.1-229.3, 1587.4-229.3, 240.6-370, 249.2-370, and 559.1-370 keV cascades, spin-parity assignments of $(5/2)^+$, $(7/2)^+$, $(11/2)^-$, $(7/2)^+$, $(7/2)^+$, $(9/2)^-$, $(7/2)^+$, $(7/2)^-$, $(7/2)^-$, $(9/2)^-$, $(9/2)^-$, and $(5/2)^+$ have been made to the ground, 229.3, 625.3, 778.2, 861.7, 995.3, 1122.9, 1235.9, 1244.5, 1360.3, 1554.5, and 1816.6 keV states of ^{147}Eu, respectively. These spin-parity assignments are unique since they are measured by different cascade branchings. The results have been discussed and compared with previous works.

45009 **sup(90,92)Zr(p vector,p') reactions at Esub(p)=800 MeV.** Baker, F.T.; Scott, A.; Grimm, M.A.; Love, W.G.; Penumetcha, V. (Georgia Univ., Athens (USA)); Glashauser, C. (Rutgers - the State Univ., New Brunswick, NJ (USA)); Adams, G.S.; Igo, G. (California Univ., Los Angeles (USA)); Hoffmann, G.W. (Texas Univ., Austin (USA)); Moss, J.M. (Los Alamos National Lab., NM (USA)). *Nuclear Physics* [*Section*] *A;* **393**: No. 3, 283-300(7 Feb 1983).

Angular distributions of analyzing powers and differential cross sections have been measured for elastic and inelastic scattering of 800 MeV protons from ^{90}Zr and ^{92}Zr. The data have been interpreted using both the collective-model distorted-wave Born approximation and the semimicroscopic distorted-wave impulse approximation with the Love and Franey f-matrix. Clear differences in the data for transitions to both the 2_1^+ and the 4^+ states in the two nuclei, attributable to differences in the microscopic structures of the states, have been observed. These differences are only partially explained by the semimicroscopic analyses. Interpreting the Asub(y) data with the help of recent data-to-data relations suggests that the free L x S interaction used at 800 MeV is incorrect.

45010 **Prompt compound nuclear K X-rays in fusion reactions induced by a heavy projectile.** Ernst, H.; Henning, W.; Davids, C.N.; Freeman, W.S.; Humanic, T.J.; Paul, M.; Sanders, S.J. (Argonne National Lab., IL (USA)); Prosser, F.W. Jr.; Racca, R.A. (Kansas Univ., Lawrence (USA)). *Physics Letters,* [*Section*] *B;* **119**: No. 4-6, 307-310(Dec 1982).

Prompt K X-rays were studied in compound nuclear reactions induced by a heavy projectile. Total production cross sections and multiplicities of K X-rays were measured for the systems ^{32}S + sup(116,120,124)Sn by determining X-ray singles, X-ray-X-ray coincidence, and direct evaporation residue yields over the incident energy range 130 MeV <= Esub(lab) <= 202 MeV. We find a slow dependence of the multiplicities and cross sections on target mass and incident energy, establishing the prompt K X-ray yields as a useful indicator of the complete fusion cross section behavior induced by a heavy projectile in this mass region.

6518 Nuclear Properties And Reactions, A=150-189

REFER ALSO TO CITATION(S) 44975

45011 **Average resonance capture studies of /sup 162,164/Dy.** Warner, D.D.; Casten, R.F.; Kane, W.R.; Gelletly, W. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2292-2310(May 1983). Contract AC02-76CH00016.

Primary γ-ray transitions in ^{162}Dy and ^{164}Dy have been studied following average resonance neutron capture with neutron beams of mean energy 2 and 24 keV. The averaging process guarantees the observation of the complete set of J/sup π/ = 1^-/sup(+), 2^{+-}, 3^{+-}, 4^-/sup(+) states in ^{163}Dy (^{165}Dy) up to an excitation energy of 2 MeV. Use of the results of recent Monte Carlo calculations has been made to establish semiquantitative criteria for the J/sup π/ assignments. Further spin limitations have been imposed by the study of primary transitions following capture in the 2.72 and 3.68 eV resonances in ^{163}Dy and the 1.71 eV resonance in ^{165}Dy. The known completeness of the set of observed levels has been used to establish a correspondingly complete band structure in both nuclei. The results are discussed in the framework of both the interacting boson approximation and the geometrical model.

45012 **Muonic x-ray measurement of the monopole and quadrupole charge parameters of /sup 154-158,160/Gd.** Laubacher, D.B.; Tanaka, Y.; Steffen, R.M.; Shera, E.B.; Hoehn, M.V. (Department of Physics, Purdue University, West Lafayette, Indiana 47907). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1772-1789(Apr 1983).

Monopole and quadrupole charge distributions of ^{154}Gd, ^{155}Gd, ^{156}Gd, ^{157}Gd, ^{158}Gd, and ^{160}Gd were investigated by muonic-atom K and L x-ray measurements. The model-independent Barrett charge radii R/sub k/ and the isotope shifts ΔR/sub k/ were measured, and values of $\langle r^2 \rangle$ and $\Delta\langle r^2 \rangle$ were deduced. A pronounced even-odd staggering effect of the nuclear charge radii was observed for the series $^{150-158}$Gd. The quadrupole moments of the first excited states of the even-A Gd nuclei were determined to be $Q^{154}(2^+)$ = -1.82(4) e b, $Q^{156}(2^+)$ = -1.93(4) e b, $Q^{158}(2^+)$ = -2.01(4) e b, and $Q^{160}(2^+)$ = -2.08(4) e b, and the quadrupole moments of the $(3/2)^-$ ground states of the odd-A /sup 155,157/Gd nuclei were determined to be $Q^{155}((3/2)^-)$ = 1.27(3) e b and $Q^{157}((3/2)^-)$ = 1.35(3) b. Comparison with a separate measurement of the odd-A ground-state quadrupole moments based on the static hyperfine splitting of the muonic M x rays showed that the model error in the extracted quadrupole moments of these nuclei is less than 2 percent. The quadrupole moments and the B(E2) values obtained in the present experiment for the low-lying Gd states are in satisfactory agreement with the axially symmetric rotational model. However, the ^{154}Gd nucleus exhibits a considerable softness as indicated by the isomer shift of the 2^+ excited state and by the experimental value of the ratio $Q(2^+)/B(E2{:}0^+ \rightarrow 2^+)$.

45013 **Decay of mass-separated ^{166}Yb.** Mlekodaj, R.L.; Spejewski, E.H.; Toth, K.S.; Ellis-Akovali, Y.A. (UNISOR, Oak Ridge Associated Universities, Oak Ridge, Tennessee 37830). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1182-1187(Mar 1983).

The isotope ^{166}Yb was produced via the ^{147}Sm(^{16}O,7n) reaction and was mass separated with an on-line isotope separator. Its decay properties were studied by using γ-ray, x-ray, and α-particle detectors. The half-life and α decay energy extracted were found to agree with values from earlier α-decay investigations. In addition,

the (EC+β^+) decay of ^{156}Yb was identified for the first time. This decay to ^{156}Tm is accompanied by only one strong γ ray, an E1 transition of 115.2 +- 0.2 keV. It is proposed that, as in the case of the /sup 148,150,152/Dy decays to odd-odd terbium nuclei, essentially all of the ^{156}Yb β decay proceeds to a 1^+ level in ^{156}Tm at ~115 keV by an allowed transition, logft~3.9. This 1^+ level then depopulates to a 2^- at or near the ground state. Alpha-decay branching ratios were deduced for ^{156}Yb, ^{156}Tm, ^{153}Er, and ^{153}Ho.

45014 **Identification of a new isotope ^{165}Tb.** Greenwood, R.C.; Gehrke, R.J.; Baker, J.D.; Meikrantz, D.H.; Reich, C.W. (Idaho National Engineering Laboratory, EG and G Idaho, Incorporated Idaho Falls, 83415). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1266-1270(Mar 1983).

A previously unreported isotope, ^{165}Tb, has been identified and its half-life has been measured to be 2.11 +- 0.10 min. This activity was observed in the Tb fraction separated, using a high-performance liquid chromatograph, from the fission products resulting from spontaneous fission of ^{252}Cf. Some 24 γ ray have been associated with the ^{165}Tb decay, ~16 of which have been placed in a level scheme for ^{165}Dy. New features of the ^{165}Dy level scheme are excited states at 1337.1, 1400.2 1773.1, and possibly 1813.7 keV, which are fed by transitions with logft values between 5.1 and 5.7. Configuration assignments for these states are discussed.

6519 Nuclear Properties And Reactions, A=190-219

REFER ALSO TO CITATION(S) 44996, 44998

45015 **(NFL—34) Neutron elastic scattering in the energy region 1.5 to 4.0 MeV for radiogenic lead and bismuth.** Olsson, N.; Holmqvist, B.; Ramstroem, E. (Studsvik Science Research Lab., Nykoeping (Sweden)). 1982. 58p. NTIS (US Sales Only), PC A04/MF A01. Order Number DE83701060.

Elastic scattering of 1.5 to 4.0 MeV neutrons from radiogenic lead, Pb sub (r), and ^{209}Bi has been measured using a time-of-flight technique. The experimental results show the existence of a b broad maximun in the angle integrated elastic cross section centered at a neutron energy of about 3 MeV for both elements. Further, this cross-section maximum is more pronounced for ^{209}Bi than for Pb sub (r). The data were analysed in terms of an optical model potential with spherical symmetry. The energy dependence of the total shape elastic cross sections calculated for Pb sub (r) and ^{209}Bi from this model shows only minor differences, which are caused by the small mass difference and the fact that nuclear structure effects are not taken into account in the optical model. The observed cross section differences between Pb sub (r) and ^{209}Bi have been explained as a compound nucleus effect caused by the essentially larger ground state spin of ^{209}Bi as compared to Pb sub (r). Different formalisms have been used to correct the calculated compound elastic cross sections for level width fluctuations.

45016 **Levels in $_{84}$204Po from the decay of $_{85}$^{204}At.** Helmer, R.G.; Reich, C.W. (Idaho National Engineering Laboratory, EG&G Idaho, Incorporated, Idaho Falls, Idaho 83415). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2248-2260(May 1983).

The electron-capture decay of $_{85}$^{204}At (9 min) has been studied by means of γ and e^- multiscaled singles and γ-γ coincidence measurements with Ge(Li) and Si(Li) detector systems. The samples were produced by Ir(^{16}O, xn) reactions and on-line isotope separation. About 50 γ-ray transitions have been assigned to the ^{204}At decay, ~35 of which have been placed in a proposed level scheme for $_{84}$^{204}Po. The energy of the $8^+ \rightarrow 6^+$ isomeric transition has been deduced to be 12.1 keV, and the half-life of the 8^+ isomer has been measured to be 150 +- 10 ns. From these data, the B(E2) value of this isomeric transition is found to be 3.7 Weisskopf units. The ^{204}At ground state is assigned an I/sup π/ value of 7^+, which eliminates the need for some low-energy levels in ^{204}At and ^{200}Bi that were tentatively proposed in recent data evaluations, where a 5^+ assignment was made.

45017 **Structure of ^{209}Bi deduced from the ^{208}Pb(t,2nγ) reaction.** Maier, K.H.; Nail, T.; Sheline, P.K. (Hahn-Meitner Institute, Berlin, Federal Republic of Germany and Florida State University, Tallahassee, Florida 32306). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1431-1453(Apr 1983).

States in ^{209}Bi were populated with the ^{208}Pb(t,2n) reaction. Incident triton energies between 11 and 16 MeV were used. Gamma-ray excitation functions, angular distributions, and γ-γ-time coincidence spectra were measured. Approximately 50 newly-observed γ rays have been assigned to transitions in ^{209}Bi. Previously-unresolved doublets at E/sub x/ = 2600, 3135, and 3154 keV have been identified. A new level at 3270 keV is reported, and the 3197-keV level is verified. ^{209}Bi level energies are reported with an accuracy of 600 eV or less. A level scheme for E/sub x/<4.14 MeV is presented, including spin-parity assignments. A new M1 transition between the $(5/2)^+$ and $(3/2)^+$ members of the πh/sub 9/2/x3^- septuplet is reported. The 19 levels belonging to the νg/sub 9/2/p/sub 1/2/ $^{-1}$, πh/sub 9/2/ are identified.

45018 **Two-step contributions in the ^{206}Pb(t,p) ^{208}Pb two-neutron transfer reaction.** Alford, W.P.; Boyd, R.N.; Sugarbaker, E.; de Boer, F.W.N.; Brown, R.E.; Flynn, E.R. (The University of Western Ontario, London, Ontario, Canada N6A 3K7). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1032-1039(Mar 1983).

The ^{206}Pb(t,p) reaction has been studied over the angular range from 10° to 60° at a triton energy of 17 MeV. Cross sections and analyzing powers were measured for 11 states between 2.6 and 5.0 MeV excitation, including the 4^- state at 3.475 MeV. The two-neutron transfer reaction to this state was represented by a sequential transfer calculation. Data for three natural parity states, in particular the analyzing powers, were not fitted well by one-step distorted-wave Born approximation calculations. Numerous sequential transfer calculations with different transfer configurations were tried for each of these states. While most of the calculations produced results similar to the distorted-wave Born approximation results, at least one calculation was found for each state which gave an improved representation over that of the distorted-wave Born approximation. The failure of the distorted-wave Born approximation documents the need to apply sequential transfer reaction processes in general descriptions of two-nucleon transfer reactions.

45019 **Single proton structure of /sup 193,195,197/Ir and perturbed spin(6) symmetry.** Cizewski, J.A.; Burke, D.G.; Flynn, E.R.; Brown, R.E.; Sunier, J.W. (A. W. Wright Nuclear Structure Laboratory, Yale University, New Haven, Connecticut 06511). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1040-1059(Mar 1983).

The /sup 194,196,198/Pt (t,α) /sup 193,195,197/Ir reactions have been studied with a 17 MeV polarized triton beam. Based on the measured angular distributions of cross sections and analyzing powers, several new I/sup π/ assignments were made in ^{195}Ir and new levels were identified in ^{197}Ir. The change in the distribution of d/sub 3/2/ spectroscopic strength as a function of neutron number is observed to be quite dramatic. Two large fragments are observed in ^{193}Ir, all of the d/sub 3/2/ strength is concentrated in the ground state of ^{197}Ir, and ^{195}Ir shows a situation intermediate between these two. The empirical d/sub 3/2/ strength in ^{195}Ir is well reproduced by the predictions of the U(6/4) supersymmetry proposed for the Os-Ir-Pt nuclei. The change in the d/sub 3/2/ strength as a function of neutron number is well reproduced by a perturbation of this symmetry.

45020 **Breakup of spectator residues in relativistic nuclear collisions.** Warwick, A.I.; Wieman, H.H.; Gutbrod, H.H. (Gesellschaft fuer Schwerionenforschung, D-1600 Darmstadt, Federal Republic of Germany). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1083-1102(Mar 1983).

Low energy nuclear fragments (12< or =A< or =140) from the bombardment of Au by high energy protons, ^{4}He, and ^{20}Ne projectiles are measured to yield information on the breakup of the target nucleus. We discuss the shapes of the fragment energy spectra across this broad range of fragment mass and pick out the fission component by its binary breakup. Multiplicities of coincident

fast charged particles are presented as a measure of the degree of violence of the initial stage of the collision. Angular distributions of light fragments (8< or =Z< or =11) give the average velocities imparted to the residue in central collisions, and these values are compared to the results of cascade calculations. Measurements of slow fragment multiplicities from central events reveal a many-fragment final state. In the light of this finding we develop a simple calculation of the Coulomb features of the observed spectra. The applicability of a statistical breakup model is discussed.

45021 **Energy deposition accompanying pion double charge exchange: Radiochemical study of the ^{209}Bi(π^+,π^- xn)/sup 209-x/At reactions.** Clark, J.L.; Haustein, P.E.; Ruth, T.J.; Hudis, J.; Caretto, A.A. Jr. (Chemistry Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1126-1133(Mar 1983).

The pion double charge exchange reactions, ^{209}Bi(π^+,π^- xn)/sup 209-x/At, have been studied by radiochemical techniques for incident pion energies of 100, 180, and 300 MeV. Cross sections for the chemically separated At isotopes (A = 205—209) were determined by alpha-particle and gamma-ray spectroscopy. The contribution of secondary processes, such as ^{209}Bi(π^+,/sup 3,4/He)X followed by ^{209}Bi(^{4}He,xn)/sup 213-x/At and ^{209}Bi(^{3}He,xn)/sup 212-x/At; which mimic the double charge exchange process, was evaluated through a study of the ^{209}Bi(π^-,X)At reactions, since double charge exchange channels cannot contribute to At production in such π^- interactions. Such secondary reactions were further characterized through target thickness studies employing 100—300 MeV π^- beams. An upper limit of the cross sections for ^{209}At production via elastic or inelastic double charge exchange below particle emission thresholds was determined to be 6 μb: a result which is roughly consistent with independent spectrometer measurements. Double charge exchange processes in which 8—50 MeV of excitation energy remains in ^{209}At (to be later dissipated by neutron evaporation) are found to be much more probable as evidenced by the ^{209}Bi(π^+,π^- xn)/sup 209-x/At, x = 2—4 excitation functions which are seen to be strongly and inversely dependent on the incident pion energy.

45022 **Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry.** Casten, R.F.; Warner, D.D.; Gowdy, G.M.; Rofail, N.; Lieb, K.P. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1310-1320(Mar 1983).

A complete set of the low lying 1/2$^-$ and 3/2$^-$ levels of /sup 197,199/Pt was obtained from measurements of the primary γ-ray spectra following average resonance neutron capture experiments at incident neutron energies centered at 2 and 24 keV. A combination of the ^{197}Pt results with those of a recent (t,p) experiment allows the further restriction of spin-parity assignments, including some for levels with J> or =5/2. The results are discussed in comparison with those previously obtained for ^{196}Pt in terms of the Nilsson model and the recently proposed multi-j supersymmetry that may apply in this O(6)-like region.

45023 **Charged-particle exclusive analysis of central Ar+KCl and Ar+Pb reactions at 1.8 and 0.8 GeV nucleon.** Stroeble, H.; Brockmann, R.; Harris; J.W. (Gesellschaft fuer Schwerionenforschung, D-6100 Darmstadt 11, West Germany). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1349-1352(Mar 1983). Contract AC03-76SF00098.

An event by event analysis is carried out for all charged particles observed in central collisions of ^{40}Ar+KCl and ^{40}Ar+Pb at 1.808 and 0.772 GeV/nucleon, respectively. Total transverse energy is used for impact parameter selection within the central trigger condition. The central Ar+KCl reaction exhibits a forward-backward oriented momentum flux. The flux distribution of the most central Ar+Pb events is approximately isotropic in the fireball center of mass.

6520 Nuclear Properties And Reactions, A=220 And Above

45024 **Mass distributions in monoenergetic-neutron-induced fission of ^{239}Pu.** Gindler, J.E.; Glendenin, L.E.; Henderson, D.J.; Meadows, J.W. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2058-2062(May 1983). Contract W-31-109-ENG-38.

Fission product yields for 24 masses were determined for the fission of ^{239}Pu with essentially monoenergetic neutrons of 0.17, 1.0, 2.0, 3.4, 4.5, 6.1, and 7.9 MeV. Fission product activities were measured by Ge(Li) γ-ray spectrometry of irradiated ^{239}Pu targets and by chemical separation of the fission product elements followed by β counting. Yields of near symmetric (valley) fission products increase nearly monotonically with incident neutron energy and do not exhibit a break in the slope of the yield versus neutron energy curve in the energy region where second-chance fission begins. This is in contrast to the curves for ^{232}Th, ^{235}U, and ^{238}U neutron-induced fission.

45025 **Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np.** Ahmad, I.; Hines, J.; Gindler, J.E. (Chemistry Division, Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2239-2247(May 1983). Contract W-31-109-ENG-38.

Decay schemes of 45.3-d ^{237}Pu and 1.55 x 10^6 yr ^{236}Np have been investigated by measuring their γ ray and conversion electron spectra with a 5-cm^3 x 1-cm Ge detector and a cooled Si(Li) spectrometer, respectively. Intensities of γ rays, x rays, and conversion electrons have been determined and these have been used to derive logft values for EC and β^- transitions. In addition to confirming previously known level schemes in ^{237}Np and ^{236}U, the energies of the 4+→2+ and 6+→4+ transitions in the ^{236}Pu ground state band have been determined. Relative intensities of x rays in the decay of ^{235}Np have also been measured.

45026 **Levels in ^{148}Ce from the decay of mass separated ^{148}La.** Gill, R.L.; Shmid, M.; Chrien, R.E. (Brookhaven National Laboratory, Upton, New York 11973). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1732-1744(Apr 1983). Contract AC02-76CH00016.

The level scheme of ^{148}Ce populated by β decay of ^{148}La, produced in thermal neutron fission of ^{235}U, has been studied. Ion beams of mass 148 were separated by an on-line isotope separator and deposited on a movable tape. Gamma-ray singles, γ-γ time, γ-γ angular correlations, and time sequenced γ and β spectra were collected. The half-life for ^{148}La was measured to be 1.05 +- 0.01 s. A level scheme for ^{148}Ce is presented including several members of the ground, β, γ, and octupole bands. The resulting level scheme has been compared with other N = 90 nuclides and with interacting-boson-approximation-2 calculations.

45027 **Gamma intensities for ^{226}Ra and daughters, and ^{235}U.** Olson, D.G. (Department of Energy, Idaho Falls, ID (USA). Radiological and Environmental Sciences Lab.). *Nuclear Instruments and Methods in Physics Research;* **206**: No. 1/2, 313-316(15 Feb 1983).

Absolute gamma intensities were measured for ^{235}U and the ^{226}Ra decay chains. Accuracy of the reported results was derived by applying the measurements to a well-known standard.

6530 Nuclear Theory

REFER ALSO TO CITATION(S) 44929, 44990

45028 **(BNL—33166) Aspects of the finite boson number in the IBA.** Warner, D.D. (Brookhaven National Lab., Upton, NY (USA)). 1983. Contract AC02-76CH00016. 22p. (CONF-830143—2). NTIS, PC A02/MF A01. Order Number DE83014876.

From Workshop on bosons in nuclei; Philadelphia, PA, USA (28 Jan 1983).

One of the most important and distinguishing features of the IBA description of nuclear structure is the explicit inclusion of the finite number of valence nucleon in its basis, via the boson number N. To date, attempts to study the effects of the finite boson number on IBA predictions, and to verify those predictions empirically, have concentrated on high spin states, where the predicted cut off in angular momentum at L = 2N, inherent in the simple s-d basis, manifests itself in terms of a rolling over of the B(E2) values within the ground state rotational band. However, in the last few years it has become apparent that in the same regime of spin and excitation energy where these finite N effects become significant, effects from neglected degrees of freedom may also become important, such as from higher angular momentum bosons, or non-collective (two quasiparticle) excitations. Indeed, Iachello showed some examples where the inclusion of such effects can account for the empirical trends, so that it is then difficult to isolate the predictions specific to the finite boson number alone. The present discussion, therefore, is aimed at exploring the role played by the finite boson number in the properties of low lying, low spin states across a broad range of nuclei.

45029 **(INIS-mf—7742) Effective Skyrme-type interaction for the calculation of nuclear structures of the whole mass table.** Waroquier, M.E.L. (Ghent Rijksuniversiteit (Belgium). Instituut voor Kernwetenschappen). 1982. 398p. (In Dutch). NTIS (US Sales Only), PC A17/MF A01. Order Number DE83780878.

Paper copy only, copy does not permit microfiche production30 refs.

The Hartree-Fock-Bogolyubov formalism is extended for 3 body interactions and applied to spherical nuclei. The structure of the proposed extension of the Skyrme-type interaction is given, together with the analytical expression of the corresponding Hartree-Fock differential equation. The Skyrme-force parameters are modified in order to be able to reproduce the ground state properties. The problem of the spin-stability of the proposed interaction is treated. The Skyrme-interaction is applied as particle-hole interaction and saturation properties are studied. Structure of the charge, neutron density distributions and changes introduced by adding protons or neutrons are treated. (MDC).

45030 **Scattering with absorptive interaction: Energy-dependent potentials.** Cassing, W.; Stingl, M.; Weiguny, A. (Gesellschaft fuer Schwerionenforschung, 6100 Darmstadt, Federal Republic of Germany). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 1901-1912(May 1983).

The energy dependence and analytic structure of the effective interaction for elastic scattering of composite particles are investigated using Feshbach's projection technique. A generalized Levinson theorem is established for complex, nonlocal, and energy-dependent interactions. The analytical results are illustrated by means of Argand diagrams for a solvable model and the effect of energy-averaging is discussed.

45031 **Classification of exchange currents.** Friar, J.L. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2078-2084(May 1983).

After expansion of the vector and axial vector currents in powers of (v/c), a heretofore unremarked regularity results. Meson exchange currents can be classified into types I and II, according to the way they satisfy the constraints of special relativity. The archetypes of these two categories are the impulse approximation to the vector and axial vector currents. After a brief discussion of these constraints, the (rho$\pi\gamma$) and ($\omega\sigma\gamma$) exchange currents are constructed and classified, and used to illustrate a number of important points which are often overlooked.

45032 **Comparison of upper and lower bound methods using a soluble many-Fermion model.** Cambiaggio, M.C.; Klar, A.; Margetan, F.J.; Plastino, A.; Vary, J.P. (Ames Laboratory, Physics Department, Iowa State University, Ames, Iowa 50011). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2340-2355(May 1983). Contract W-7405-ENG-82.

Upper bounds, lower bounds, and estimates based on moments are compared for the ground state energy of a soluble Hamiltonian due to Lipkin. Several bounding methods based on variational approaches and one based on the method of moments are employed. We show that lower bounds are of comparable quality with upper bounds and are no more difficult to obtain. No single bounding method is found superior over the entire range of parameters we study for the soluble Hamiltonian. However, in one region we find an upper bound from one method which coincides with the lower bound of another method, thus yielding the exact ground state energy. We also show that estimation methods based on the easily calculated first and second moments of the eigenvalue distribution are surprisingly accurate for a wide range of coupling parameters and number of active particles.

45033 **Comparison of Paris potential results for the zero and continuous particle spectrum.** Matin, M.A.; Dey, M. (Department of Physics, Burdwan University, Burdwan, West Bengal, India). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 5, 2356-2362(May 1983). Contract W-7405-ENG-82.

The single particle energy is calculated self-consistently in nuclear matter using the Paris potential. Binding energy and wave functions are compared for this choice and the zero particle spectrum. A gain in binding energy of 6 MeV is obtained at normal density of which 5 MeV is due to the ^{3}S/sub 1hyphen/ ^{3}D$_1$ channel alone. The wave function for the ^{3}S/sub 1hyphen/ ^{3}D$_1$ channel shows marked enhancement in the 0.9—3.0 fm region. The saturation point is shifted to 1.6 fm^{-1} with a binding energy of about 21 MeV. Real parts of optical model parameters are also deduced and discussed.

45034 **Pion single and double charge exchange in the resonance region: Dynamical corrections.** Johnson, M.B.; Siciliano, E.R. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1647-1668(Apr 1983).

We consider pion-nucleus elastic scattering and single- and double-charge-exchange scattering to isobaric analog states near the (3,3) resonance within an isospin invariant framework. We extend previous theories by introducing terms into the optical potential U that are quadratic in density and consistent with isospin invariance of the strong interaction. We study the sensitivity of single and double charge exchange angular distributions to parameters of the second-order potential both numerically, by integrating the Klein-Gordon equation, and analytically, by using semiclassical approximations that explicate the dependence of the exact numerical results to the parameters of U. The magnitude and shape of double charge exchange angular distributions are more sensitive to the isotensor term in U than has been hitherto appreciated. An examination of recent experimental data shows that puzzles in the shape of the ^{18}O(π^+,π^-)^{18}Ne angular distribution at 164 MeV and in the A dependence of the forward double charge exchange scattering on ^{16}O, ^{26}Mg, ^{42}Ca, and ^{48}Ca at the same energy may be resolved by adding an isotensor term in U.

45035 **Transition densities for charge-exchange components of giant isovector resonances and the proton-neutron density distributions in nuclei.** Auerbach, N.; Klein, A. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 4, 1818-1821(Apr 1983).

Sum rules that hold in the case of a self-consistent charge-exchange random phase approximation theory are used here to derive transition densities for the charge-exchange components of isovector giant resonances. The derived transition densities are then employed in a calculation of ($\pi(,\pi^0$) cross sections.

45036 **Fission dynamics simplified.** Hofmann, H. (Los Alamos Scientific Lab., NM (USA). Theoretical Div.; Technische Univ. Muenchen, Garching (Germany, F.R.). Fakultaet Physik); Nix, J.R. (Los Alamos Scientific Lab., NM (USA). Theoretical Div.). *Physics Letters,* [*Section*] *B;* **122**: No. 2, 117-120(3 Mar 1983).

By use of Kramers' stationary solution of the Fokker-Planck equation for the inverted oscillator, we derive analytic expressions as functions of nuclear temperature and dissipation coefficients for

several quantities of interest in the dynamics of nuclear fission. These include the mean time from the saddle point to scission, the mean pre-scission fission-fragment kinetic energy and the contribution to the variance in the fission-fragment kinetic energy resulting from fluctuations in the fission degree of freedom.

45037 **Comparison of the semiclassical coupled channel theory of particle transfer with exact calculations.** Esbensenm, H.; Broglia, R.A.; Winther, A. (The Niels Bohr Institute, University of Copenhagen, Copenhagen, Denmark). *Annals of Physics (New York);* **146**: No. 1, 149-173(Mar 1983).

Making use of numerical techniques recently developed, inelastic and transfer processes associated with the collision of two systems have been exactly solved in a one-dimensional model. Comparisons are carried out with a coupled channel treatment and perturbation theory. The results are used to estimate the validity of the different approximations for the case of collisions between heavy ions.

45038 **Influence of nucleon internal degrees of freedom on the strength of electric giant resonances at low energies.** Auerbach, N. (Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854.). *Physical Review* [*Section*] *C: Nuclear Physics;* **27**: No. 3, 1346-1348(Mar 1983).

The influence of nucleon excitations to N^*'s on the giant dipole (or other electric resonances) is estimated. The correction is found to be very small.

45039 **Systematics of nuclear matter properties in a non-linear relativistic field theory.** Boguta, J.; Stocker, H. (California Univ., Berkeley (USA). Lawrence Berkeley Lab.). *Physics Letters,* [*Section*] *B;* **120**: No. 4-6, 289-293(13 Jan 1983).

The properties of symmetric nuclear matter are investigated in a phenomenological non-linear relativistic field theory of nuclear matter. A mean field approximation is made. We find that the equation of state over a considerable density range is determined by the nuclear matter compressibility modulus. A family of equations of state is considered that fit all known bulk properties of nuclear matter, including the energy dependence of the optical potential. The importance of non-Yukawa type nuclear interactions is discussed.

6540 Radiation And Shielding Physics

REFER ALSO TO CITATION(S) 43852, 44280, 44640, 44646, 44872, 44899

45040 **(GSF-P—207) Range distributions of low-energetic light ions in silicon.** Wach, W. (Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Angewandte Physik). Nov 1981. 87p. (In German). NTIS (US Sales Only), PC A05/MF A01. Order Number DE83750202.

Range distributions of the ions Li^+, B^+, N^+, O^+, F^+, Na^+, Mg^+, and Al^+ in amorphous silicon were determined for implantation energies between 1 and 40 keV. For the doping different ion sources and a 50-keV-accelerator were constructed. The analysis was performed by means of the secondary-ion mass spectroscopy. At the examples ^6Li and ^7Li, e.g. ^{10}B and ^{11}B isotope effects at the implantation were also studied. In the amorphous material at first for energies E above 10 keV (lithium) e.g. 20 keV (boron) shorter ranges of the lighter isotope were observed. At channeling of boron ions in crystalline material already at E=5 keV clear differences were shown. The isotope effect were ascribed to the larger electronic stopping power for the lighter isotope at the same energy. The maximal ranges observed at 5 and 10 keV are in agreement with the assumption of a velocity-proportional electronic stopping power.

45041 (GSI—82-8, pp 578-584) **Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids.** Geissel, H.; Laichter, Y.; Schneider, W.F.W.; Armbruster, P. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Part of Ph. D. Thesis by H. Geissel.

Measured stopping powers and ranges of (0.1 - 2.4) GeV ^{238}U ions in C, Al, Ni, Sn, and Au are presented in tables.

45042 (GSI—82-8, pp 626-631) **Neutron fuel interaction in a HIBALL target.** Goel, B.; Henderson, D. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

We have developed a reasonably accurate and fast method based on Dirac's collision density model to calculate the fuel heating due to neutrons. The predominant reaction of 14 MeV neutrons with deuterium, tritium and helium is elastic scattering which is highly anisotropic. In addition, deuterium has also an appreciable component of (n, 2n) reaction at 14 MeV.

45043 (INIS-SU—135, pp 208-210) **Kinetics of charged particle implantation in dielectrics taking into account the effect of space charge build-up.** Remizovich, V.S.; Rudenko, A.I. (Moskovskij Inzhenerno-Fizicheskij Inst. (USSR)). 1980. (In Russian). NTIS (US Sales Only), PC A16/MF A01. (CONF-770931—Vol.2).

From 7. international conference on atomic collisions in solids; Moscow, F.R. Germany (19 Sep 1977).

The effect of the space charge accumulation on depth distributions of charged particles in dielectric for different duration of irradiation has been considered. An analytical solution of transfer equation for heavy charged particles with provision for the effect of a self-consistent field of the space charge has been obtained. Derived were formulae for distributions in ranges and density of stopped particles in the case of slow particles (initial velocity $V_0 <$ or approximately 10^8 cm/s), fast particles ($V_0 >> 10^8$ cm/s) and for the case when the bremsstrahlung capability of the medium may be approximated with a constant T_0/R_0, where T_0 - initial kinetic energy of particles, R_0 - maximum range.

45044 (INIS-SU—142, pp vp) **Dechanneling function for relativistic axially channeled electrons.** Muralev, V.A.; Telegin, V.I. (Moskovskij Gosudarstvennyj Univ. (USSR). Nauchno-Issledovatel'skij Inst. Yadernoj Fiziki). 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Behaviour of the $\chi(t)$ dechanneling function depending on the depth is theoretically studied. Theoretical consideration of $\chi(t)$ for axial channeled relativistic electrons in anisotropic medium results in two-dimensional kinetic equation with mixed derivatives of the parabolic type. The kinetic equation in the approximation of the continuous Lindchard model for relativistic axial channeled electrons is numerically solved. The depth dependence of the $\chi(t)$ dechanneling function is obtained.

45045 (INIS-SU—142, pp vp) **Theory of thermal dechanneling from axial channels.** Rozhkov, V.V. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.:; Rutkevich, P.B. (Khar'kovskij Gosudarstvennyj Univ. (Ukrainian SSR)). 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The theory of particle dechanneling from axial channels under the effect of thermal oscillations of the atoms in the crystal lattice is plotted. The theory is based on direct analysis of stochastic properties of the particle motion in the channel under the effect of thermal oscillations, the Fokker-Planck equation for the distribution function of channeled particles over the transverse energy is obtained. The parametric effect of thermal oscillations of the crystal atoms on the transverse motion of the channeled particles is determined. Analytical expressions for the distribution function of channeled particle over the transverse energy, dechanneling function and integral penetration depth distribution function are obtained for particles injected into a crystal under channeling condi-

tions. The theoretical results agree with the results of computer simulation of the channeling phenomenon.

45046 (INIS-SU—142, pp vp) **Hypersonic wave emission by channeling particles.** Gann, V.V.; Zhukov, A.I.; Rozhkov, V.V. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Excitation of elastic waves during the ion motion in the crystal in the channeling is considered. Angular and spectral distributions of emitted waves are calculated. It is shown that the major part of the energy is emitted by the waves with the waves length of the Debye order.

45047 (INIS-SU—145, pp 54-61) **Classical theory of relativistic charged particle radiation in crystals.** Akhiezer, I.A.; Boldyshev, V.F.; Fomin, S.P.; Shul'ga, N.F. 1980. (In Russian). NTIS (US Sales Only), PC A14/MF A01. (CONF-7905159—Pt.1).

From 10. conference on problem of charged particle beams using for studying substance composition and properties; Moscow, USSR (28 May 1979).

Interference radiation in the absence of channeling, radiation in both planar and axial channeling as well as radiation in the intermediate region during the incidence of fast charged particles on the crystal at a small angle close to the critical channeling angle are considered from the unique view point. It is shown that radiation intensity from electrons and positrons should be essentially different in channeling. This difference is caused by the fact that the trajectory of movement in the crystal of channeled electrons and positrons are different. The mentioned change of radiation intensity is in good agreement with the present experimental data.

45048 **(KFK—3386-B) Atomic and nuclear properties of materials.** Engler, J. (Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kern- und Teilchenphysik). Jul 1982. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83750196.

Additional comments and background material are given for the table of 'atomic and nuclear properties of materials' which is published by the Particle Data Group in their 'Review of Particle Properties' (Rosenfeld Tables).

45049 **(LA—9752-MS) Vectorized Monte Carlo photon transport.** Bobrowicz, F.W.; Lynch, J.E.; Fisher, K.J.; Tabor, J.E. (Los Alamos National Lab., NM (USA)). May 1983. Contract W-7405-ENG-36. 19p. NTIS, PC A02/MF A01. Order Number DE83014807.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The results of current research in the development of a CRAY algorithm for time-dependent Monte Carlo photon radiation transport is presented. The method that has been developed is a fully vectorized particle-vector scheme. This technique tracks groups of particles simultaneously using a vector-stack formalism based upon particle events. Timing comparisons between this algorithm and the traditional single-particle approach are presented.

45050 **Subshell formula for the Bethe-Born stopping approximation.** Peek, J.M. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Physical Review [Section] A: General Physics;* **27**: No. 5, 2384-2387(May 1983).

It is known that the subshell contributions to the coefficient of the O(lnE) asymptotic term of the Bethe-Born stopping-number formula are not given correctly by partitioning the squared matrix element defining this coefficient into a simple sum of its subshell contributions. This interesting result is extended to the second, or O(1), asymptotic term in the stopping number. In this case, the subshell decomposition results in a sum of two expressions. One is simply the subshell decomposition of the squared matrix element defining the O(1) coefficient for the total system. The second term is more complex in form but sums to zero, as it must, when summed over all subshells in the target. It is pointed out that this second term and its summation requirement can be used to impose a useful restriction on the construction of theoretical subshell corrections for the Bethe-Born formula.

45051 **Detailed analysis of the scope of the modified Firsov model.** Cruz, S.A.; Vargas-Aburto, C.; Brice, D.K.; Alonso, E.V.; Armour, D.G. (Instituto de Fisica, Universidad Nacional Autonoma de Mexico, Apartado Postal 20-364, Delegacion Alvaro Obregon, 01000 Mexico, Distrito Federal, Mexico). *Physical Review [Section] A: General Physics;* **27**: No. 5, 2403-2420(May 1983).

A detailed and systematic analysis of the scope of the Firsov model as modified by Cheshire when no adjustable parameters are included in the calculations of the low-velocity electronic-stopping cross section is presented. For this purpose we summarize and extend our previously reported [Radiat. Eff. Lett. 43, 79 (1979); Nucl. Instrum. Methods 170, 205 (1980)] preliminary results on the role of all computational degrees of freedom that influence the outcome of the calculations, namely, (a) inclusion of trajectory, (b) accuracy of wave functions and speed of atomic electrons, (c) motion of Firsov's plane, and (d) consideration of experimental conditions. We find that the Firsov theory is accurate only within a factor of 2; therefore, at least a scale factor is necessary in order to get reasonable agreement with experiment.

45052 **Observation of large deviations from the Bethe-Bloch formula for relativistic uranium ions.** Ahlen, S.P.; Tarle, G. (Department of Physics and Space Sciences Laboratory, University of California, Berkeley, California 94720). *Physical Review Letters;* **50**: No. 15, 1110-1113(11 Apr 1983). Contract W-7405-ENG-48.

By measuring the range deficit of 955-MeV/u ^{238}U ions in copper, the authors have identified very large deviations of the stopping power from the standard Bethe-Bloch formula. They show that this discrepancy can be accounted for by higher-order terms in the Mott cross section and by the relativistic Bloch correction. The significance of this result with regard to two high-energy astrophysics experiments is discussed.

45053 **Measurement of parity non-conserving neutron spin rotation in lead and tin.** Heckel, B.; Ramsey, N.F. (Harvard Univ., Cambridge, MA (USA)); Green, K.; Greene, G.L. (Science Research Council, Chilton (UK). Rutherford and Appleton Labs.); Gaehler, R.; Schaerpf, O. (Institut Max von Laue - Paul Langevin, 38 - Grenoble (France)); Forte, M. (Commission of the European Communities, Ispra (Italy). Physical Div.); Dress, W.; Miller, P.D. (Oak Ridge National Lab., TN (USA)); Golub, R. (Technische Univ. Muenchen, Garching (Germany, F.R.)). *Physics Letters, [Section] B;* **119**: No. 4-6, 298-302(Dec 1982).

The rotation, PHIsub(PNC), of a neutron beam polarization vector due to parity non-conserving forces is observed in natural Pb and Sn targets. The following values for PHIsub(PNC)/l in units of 10^{-6} rad/cm are found: Pb: +(2.24 +- 0.33), and Sn: -(3.19 +- 0.40). A positive sign corresponds to a right-handed rotation of the neutron spin about its momentum.

45054 **(DESY-L-Trans—270) Substance ionization by a superheavy monopole.** Mikhailov, V.F. (Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)). Nov 1982. Translation of IFVE—18-18, 1982. 3p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780991.

Negative results in experiments searching for magnetic monopoles in natural formation and cosmic rays might be explained by a small ionization power of the monopole. If the monopole mass is equal to 10^{16} GeV, as we may infer from the Grand Unification Theory, ionization losses at nonrelativistic energies of a monopole will be vanishing because of kinematics of particle interaction with very different masses. A low velocity of the superheavy monopole with nonrelativistic kinetic energy restricts the detector usage, working on the ionization principle and registration of Cerenkov radiation. The lower limit of the monopole energy, which can be recorded by the ionization detector, is estimated to be 10^{10} GeV.

45055 **Research with X rays.** Sparks, C.J. Jr. (Oak Ridge National Lab., TN (USA)). *Ceskoslovensky Casopis pro Fysiku;* **32**: No. 5, 433-451(Oct 1982). (In Czech).

Translated from Phys. Today (1981) v. 34(5) p. 40-49.

The main advantage of synchrotron sources of X radiation is the high intensity of radiation and the possibility of tuning these sources with regard to a certain electron level, which allows the detailed study of spatial distribution and of the electron structure of atoms in solid matter. This is important not only for the development of the theory of condensed systems but also for the development of materials with required physical and chemical properties. The X-ray component of synchrotron radiation is used for the observation of biological materials at great magnification and in the presence of water, for the study of the atomic structure of catalytic surfaces during catalysis, for the observation of phenomena present during crystal growth or during plastic deformation in millisecond time intervals, and for the determination of the binding distance of monomolecular layers, etc.

45056 **(KFK-tr—682) Experimental study of the neutron spectra of lead, using a 14 MeV neutron source.** Aleksandrov, V.D.; Zagryadskii, V.A.; Markovskii, D.V.; Novikov, V.M.; Chuvilin, D.Yu.; Shatalov, G.E. Translated from *Atomnaya Energiya ;* **52**: No. 6, 422-423(1982). 6p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780992.

By application of a lead-neutron-multiplier in the blanket of a fusion reactor, containing no fission material, the neutron intensity and thus the tritium yield can be enhanced. For a precise determination of the neutron constants of lead, in the case of which neutron multiplication is effected by the (n,2n)-reaction, it is of interest to study the neutron spectrum behind the lead layer, using neutron generators as a neutron source.

45057 **(ORNL-tr—5033) UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems.** Nair, R.K. (Oak Ridge National Lab., TN (USA); Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais). 10 Apr 1980. Contract W-7405-ENG-26. Translation of Nota Tecnica EAV/NT - 003/80. 20p. NTIS, PC A02/MF A01. Order Number DE83015041.

Portions are illegible in microfiche products.

A program for the solution of the Multigroup Diffusion Equations in one dimensional geometries by numerical integration is described. The fluxes are determined by iterative procedure starting with a regional distribution of fission source furnished. The code also performs the adjoint flux calculation and critical size search.

45058 **Neutron-proton bremsstrahlung at 4.8 MeV.** Whittaker, J. Cape Town, South Africa; University of Cape Town (1979). 118p. Registrar, University of Cape Town, Rondebosch, 7700, South Africa.

Thesis (Ph.D.).

The differential cross-section for neutron-proton bremsstrahlung at an incident energy of 4.8 MeV has been measured where the outgoing nucleon angles were theta(n) = 35 degrees, theta(p) = 25 degrees. An upper limit to d^2sigma/dOMEGA(n)dOMEGA(p) of 210μb/sr^2 was found. The experimental method was unusual in that the target was an organic scintillation crystal which also served as recoil proton detector, and the bremsstrahlung photon was detected in addition to the two nucleons in a second crystal. An estimate of the cross-section corresponding to this experiment has been made using elastic scattering parameters. The measured upper limit is above this and other theoretical predictions, but represents a marked improvement over previous measurements in the energy range.

6550 Medical Physics

45059 **(NUREG/CR—2957) Measurements of gamma-ray dose from a moderated ^{252}Cf source.** McDonald, J.C.; Griffith, R.V.; Plato, P.; Miklos, J. (Pacific Northwest Lab., Richland, WA (USA)). Jun 1983. Contract AC06-76RL01830. 21p. (PNL—4590). NTIS, PC A02/MF A01 - GPO $3.25. Order Number DE83015437.

The gamma-ray dose fraction from a moderated ^{252}Cf source was determined by using three types of dosimetry systems. Measurements were carried out in air at a distance of 35 cm from the surface of the moderating sphere (50 cm from the source which is at the center of the sphere) to the geometrical center of each detector. The moderating sphere is 0.8-mm-thick stainless steel shell filled with D_2O and covered with 0.5 mm of cadmium. Measurements were also carried out with instruments and dosimeters positioned at the surface of a 40 cm x 40 cm x 15 cm plexiglass irradiation phantom whose front surface was also 35 cm from the surface of the moderating sphere. A-150 tissue-equivalent (TE) plastic ionization chambers and a TE proportional counter (TEPC) were used to measure tissue dose, from which the neutron dose equivalent was computed. The ratio of gamma-ray dose to the neutron dose equivalent was determined by using a relatively neutron-insensitive Geiger-Mueller (GM) counter and thermoluminescent dosimeters (TLD). In addition, the event-size spectrum measured by the TEPC was also used to compute the gamma-ray dose fraction. The average value for the ratio of gamma-ray dose to neutron dose equivalent was found to be 0.18 with an uncertainty of about +- 18%.

45060 **(SLAC-PUB—3153) Personnel neutron dosimetry at SLAC.** Busick, D.D.; Jenkins, T.M.; Swanson, W.P. (Stanford Linear Accelerator Center, CA (USA)). 9 Jun 1975. Contract AC03-76SF00515. 5p. NTIS, PC A02/MF A01. Order Number DE83014918.

The rationale and methods of the personnel neutron-dosimetry system used at SLAC are presented and discussed.

45061 **Scaling neutron absorbed dose distributions from one medium to another.** Awschalom, M.; Rosenberg, I.; Ten Haken, R.K. (Fermilab Neutron Therapy Facility, Batavia, Illinois 60510). *Medical Physics;* **10**: No. 4, 436-443(Jul 1983).

Central axis depth dose (CADD) and off-axis absorbed dose ratio (OAR) measurements were made in water, muscle and whole skeletal bone tissue-equivalent (TE) solutions, mineral oil, and glycerin with a clinical neutron therapy beam. These measurements show that, for a given neutron beam quality and field size, there is a universal CADD distribution at infinity if the depth in the phantom is expressed in terms of appropriate scaling lengths. These are essentially the kerma-weighted neutron mean free paths in the media. The method used in ICRU Report No. 26 to scale the CADD by the ratio of the densities is shown to give incorrect results. The OARs measured in different media at depths proportional to the respective mean free paths were also found to be independent of the media to a good approximation. Therefore, neutron beam CADDs and OARs may be measured in either TE solution (USA practice) or water (European practice), and having determined the respective scaling lengths, all measurements may be scaled from one medium to any other. It is recommended that for general treatment planning purposes, scaling be made to TE muscle with a density of 1.04 g cm^{-3}, since this value represents muscle and other soft tissues better than TE solution of density 1.07 g cm^{-3}. For such a transformation, relative measurements made in water are found to require very small corrections. Hence, it is further recommended that relative CADD and OAR measurements be performed in water because of its universality and convenience. Finally, a table of calculated scaling lengths is given for various neutron energy spectra and for various tissues and materials of practical importance in neutron dosimetry.

45062 **New look at displacement factor and point of measurement corrections in ionization chamber dosimetry.** Awschalom, M.; Rosenberg, I.; Ten Haken, R.K. (Fermilab Neutron Therapy Facility, P. O. Box 500, Batavia, Illinois 60510). *Medical Physics;* **10**: No. 3, 307-313(May 1983).

A new technique is presented for determination of the effective point of measurement when cavity ionization chambers are used to measure the absorbed dose due to ionizing radiation in a dense medium. An algorithm is derived relating the effective point of measurement to the displacement correction factor. This algorithm relates variations of the displacement factor to the radiation field gradient. The technique is applied to derive the magnitudes of the corrections for several chambers in a p(66)Be(49) neutron therapy beam.

6560 Solid State Physics

REFER ALSO TO CITATION(S) 44221, 44272, 44273, 44344, 44877

45063 **(DOE/ER/10750—T1) Research on surface physics and crystallography at NSLS. Technical progress report, 1 November 1982-31 October 1983.** (State Univ. of New York, Stony Brook (USA). Research Foundation). 1983. Contract AC02-80ER10750. 7p. NTIS, PC A02/MF A01. Order Number DE83015035.

This report concerns research on surface physics and crystallography that was carried out at the National Synchrotron Light Source (NSLS). The writer is a member of the participating research team (PRT) that operates beam line U7. The items presented in this report are: a list of the scientific papers produced during the current year and published or submitted for publication or presented at scientific meetings; a progress report on the operation of beam line U7 and of the uv ring; and a description of the scientific projects undertaken and of the results obtained.

45064 (INIS-mf—7626(Vol.1), pp 217) **Free energy probability distribution in the SK spin glass model.** Toulouse, G. (Ecole Normale Superieure, 75 - Paris (France). Lab. de Physique); Derrida, B. (CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)). 1981. NTIS (US Sales Only), PC A11/MF A01. (CONF-800155—Vol.1).

From 6. Brazilian symposium on theoretical physics; Rio de Janeiro, Brazil (7 Jan 1980).

The probability distribution p(Z) is reconstituted from the Knowledge of its moments <Z(sup n)>, where Z is a partition function and < > an average over disorder, in the spin glass model. (L.C.).

45065 (INIS-SU—142, pp vp) **Effect of temperature on atom-atom collision chain length in metals.** Makarov, A.A.; Demkin, N.A.; Lyashchenko, B.G. 1981. (In Russian). NTIS (US Sales Only), PC A07/MF A01. (CONF-810293—No.2).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

Focused atom-atom collision chain lengths are calculated for fcc-crystals with account of thermal oscillations. The model of solid spheres with the Born-Merier potential has been used in the calculations. The dependence of chain lengths on the temperature, energy and movement direction of the first chain atom for Cu, Au, Ag, Pb, Ni is considered. The plot presented shows that the chain lengths strongly decrease with temperature growth, for example, for the gold at T=100 K the chain length equals up to 37 interatomic spacings, whereas at T=1000 K their length decreases down to 5 interatomic distances. The dependence of the energy loss by the chain atoms on the atom number in the chain is obtained in a wide range of crystal temperature and the primary chain atom energy.

45066 **(SAND—83-0537C) Monte Carlo simulation of shock-induced lattice damage.** Dodson, B.W.; Taylor, P.A. (Sandia National Labs., Albuquerque, NM (USA)). 1983. Contract AC04-76DP00789. 5p. (CONF-830719—12). NTIS, PC A02/MF A01. Order Number DE83015189.

From Topical conference on shock waves in condensed media; Santa Fe, NM, USA (18 Jul 1983).

Portions are illegible in microfiche products.

We have developed a new technique, based on the Monte Carlo method, for simulation of the atomic-scale effects of shock loading upon model systems. Metastable atomic configurations resulting from strain rates which are fast or slow relative to configurations resulting from strain rates which are fast or slow relative to configurational equilibration rates can be calculated. Using this technique to simulate uniaxial shock and quasi-static loading of 2-D argon, we find that the degree of defectiveness strongly depends upon the strain rate. This observation may help explain the observed difference in chemical reactivity under quasi-static and shock loading.

45067 **Boundary conditions at grain boundaries.** von Roos, O. (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California 91109). *Journal of Applied Physics;* **54**: No. 7, 4209-4210(Jul 1983).

Grain boundaries in polycrystalline semiconductor material are frequently idealized as surfaces possessing a characteristic surface recombination velocity. Minority carrier densities generated by external sources (electron beams, light, etc.) in polycrystalline p—n junctions must satisfy certain boundary conditions at these grain boundaries which will be derived. It will also be shown that a "folding technique" introduced recently to deal with this problem is of limited value.

45068 **Vibronically coupled two-level systems: Radiationless transitions in the slow regime.** Goldstein, R.F.; Bialek, W. (Department of Biophysics and Medical Physics, University of California, Berkeley, California 94720). *Physical Review [Section] B: Condensed Matter;* **27**: No. 12, 7431-7439(15 Jun 1983).

We present expressions for rates of radiationless transitions in two-level systems with arbitrary coupling to a set of damped vibrational modes; calculations are limited to transitions slower than vibrational relaxation. Explicit results are discussed within the harmonic approximation and Condon approximation; systematic methods are introduced for treating non-Condon and anharmonic effects. Results relevant to experiment are (1) significant deviations from the energy-gap law when a small number of vibrational modes is coupled to the transition, (2) dependence of transition rate on homogeneous and inhomogeneous vibrational linewidths, (3) nonexponential decay for transitions with vibrational frequency shifts, and (4) persistence of electronic coherence for long times either at low temperature or when frequency shifts are small. Our approach differs from previous work in the partitioning of the Hamiltonian and in the methods of evaluating operator averages; these differences are discussed in relation to the adiabatic approximation and the irreversibility of the transition.

45069 **Position-dependent effective masses in semiconductor theory.** von Roos, O. (Jet Propulsion Laboratory, California Institute of Technology, Pasadena, California 91109). *Physical Review [Section] B: Condensed Matter;* **27**: No. 12, 7547-7552(15 Jun 1983).

The motion of free carriers (electrons and holes) in semiconductors of nonuniform chemical composition is sometimes described by means of a Hamiltonian possessing a position-dependent effective mass. In previous work we have shown that position-dependent masses lead to inconsistencies on account of Bargmann's theorem, which postulates that a coherent superposition of states of different masses (wave packets) is forbidden. We have also shown how to circumvent this selection rule. We derive an extension of Bargmann's theorem to the effect that Hamiltonians with position-dependent masses are not Galilean invariant. Furthermore, it is also shown that the customary derivation of position-dependent effective-mass Hamiltonians is by no means unique. There exist, in general, many nonequivalent Hamiltonians within the same approximation, all derivable from the basic many-body Hamiltonian, as long as the concept of a position-dependent mass is maintained. Because of the lack of uniqueness and the lack of Galilean invariance of variable-effective-mass theories it seems appropriate to abandon the concept of a position-dependent mass. In previous work we have shown how to do this successfully.

45070 **Effective conductivity by fluid analogy for a porous insulator filled with a conductor.** Berryman, J.G. (Lawrence Livermore National Laboratory, P.O. Box 808, L-200, Livermore, California 94550). *Physical Review [Section] B: Condensed Matter;* **27**: No. 12, 7789-7792(15 Jun 1983).

By combining of identities relating effective conductivity to tortuosity and tortuosity to induced mass, a general formula for the effective (electrical or thermal) conductivity of a porous insulator filled with a conductor is obtained. This formula depends on an induced-mass factor which arises by treating of the conducting material as an inviscid fluid. This induced-mass factor can be estimated with the use of an effective-medium theory. For random arrays of equal spheres, the estimates of conductivity obtained with the use of this fluid analogy are in good agreement with recent exact values derived for periodic arrays of insulating spheres to closest packing.

45071 **Concentration dependence of relaxation by dipole impurities.** Richards, P.M. (Sandia National Laboratories, Albuquerque, New Mexico 87185 and Physik Institut der Universitat Zuerich, CH-8001 Zuerich, Switzerland). *Physical Review [Section] B: Condensed Matter;* **27**: No. 11, 6968-6970(1 Jun 1983).

A simple physical approximation is shown to reproduce the calculated results of Ghosh and Huber for decay of a diffusing excitation which has an r^{-6} interaction with a low concentration of impurities. An analytic expression for the time dependence is obtained which can be applicable to problems of fluorescence and NMR relaxation by impurities with anisotropic as well as isotropic diffusion.

45072 **Electrical response of relaxing dielectrics compressed by arbitrary stress pulses.** Lysne, P.C. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Journal of Applied Physics;* **54**: No. 6, 3154-3159(Jun 1983). Contract AC04-76DP00789.

The theoretical problem of the electric response of biased dielectrics and piezoelectrics subjected to planar stress pulse loading is considered. The materials are taken to exhibit dielectric relaxation in the sense that changes in the polarization induced by electric fields do not occur instantaneouly with changes in the fields. While this paper considers arbitrary stress pulse loading of the specimen, examples that are amenable to projectile impact techniques are considered in detail. They are shock reverberation, thin pulse, and ramp loading experiments. It is anticipated that these experiments will play a role in investigations of dielectric relaxation caused by shock induced damage in insulators.

45073 **Ionic-charge modification at the surface of polar crystals.** Watson, R.E.; Davenport, J.W. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] B: Condensed Matter;* **27**: No. 10, 6418-6427(15 May 1983).

A simple variational principle has been applied to obtain a bound on the change in ionic charge of a polar crystal between the surface and the interior. Central to the estimate is the assumption that the energy involves terms analytic in the ionic charge q and that these may be treated as a sum of Madelung, intra-atomic, and interatomic (overlap and hybridization) contributions. The Madelung terms are calculated explicitly, the intra-atomic contributions are obtained from the following paper [Phys. Rev. B 27, 6428 (1983)], and the change in interatomic terms on going from the bulk to the surface is estimated by scaling with coordination number. The results do not replace detailed quantum-mechanical calculations but they are simple computationally, and they suggest trends in the competition between the Madelung potential, which encourages ion charging, and hybridization, which discourages ionic charging, both at the surface and in the interior of a crystal. Nonpolar surfaces are of principal concern but one polar surface is considered indicating that the charge disturbance penetrates much further in from the surface than it does in nonpolar cases where the effect is largely limited to the first layer of atoms.

45074 **Ionic character of polar crystals: An extended Mulliken scheme for electronegativities.** Watson, R.E.; Bennett, L.H.; Davenport, J.W. (Physics Department, Brookhaven National Laboratory, Upton, New York 11973). *Physical Review [Section] B: Condensed Matter;* **27**: No. 10, 6428-6438(15 May 1983).

The total energy of an atom can be expressed in terms of the charge q on the atom as $E(q) = E(0)+\alpha q+\beta q^2+\gamma q^3$. It is shown that the expected charge transfer q, which brings the intra-atomic energy of the atoms to a minimum, between otherwise isolated noninteracting atoms, is proportional to the difference in the α's of the constituent elements, i.e., $q = c\ \Delta\alpha$. Thus α provides a well-defined electronegativity scale, and if the third-order term γq^3 may be neglected, then α = Phi/sub m/, which is the original Mulliken scale. The quadratic term βq^2 acts to oppose charge transfer, and therefore the coefficient c, relating q to $\Delta\alpha$, depends on what elements are involved and on their relative concentration in a well-defined manner. This implies an asymmetry in charge transfer with concentration. Spectroscopic data indicate that γ, though small, is not negligible and, in such a case Phi/sub m/ is not a proper electronegativity. The extended Mulliken scheme, involving α and β, is relevant to the energetics of charge transfer and hence to the ionic character of insulating and semiconducting compounds. It allows simple baseline estimates to be made of such character. Other factors contribute to charge transfer and some of the complications associated with transition-metal compound formation are explored.

45075 **Small-polaron hopping in magnetic semiconductors.** Emin, D.; Liu, N.L.H. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Physical Review [Section] B: Condensed Matter;* **27**: No. 8, 4788-4798(15 Apr 1983). Contract AC04-76DP00789.

The theory of small-polaron hopping transport in magnetic semiconductors and insulators is formulated via a many-electron generalization of the one-electron tight-binding approach utilized in standard small-polaron theory. Here the magnetic effects are taken into account from first principles by constructing the electronic wave function from linear combinations of antisymmetrized products of Wannier states involving both the itinerant electron and the valence electrons. This enables us to determine the effect of the indistinguishability of an itinerant electron from valence electrons on the transfer of an electron between two magnetic ions. To treat hopping within a magnetic lattice the magnetic environment surrounding the two sites directly involved in a hop is approximated by an effective internal magnetic field. It is found that in the paramagnetic and ferromagnetic regimes the magnetic nature of the solid only reduces the small-polaron mobility by a weakly temperature-dependent factor of the order of unity. However, below the Neel temperature in an antiferromagnet it is found that electronic transitions only occur between nondegenerate states. This results in an additional activated factor in the small-polaron mobility.

45076 **Structural transitions in superionic conductors.** Parrinello, M.; Rahman, A.; Vashishta, P. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review Letters;* **50**: No. 14, 1073-1076(4 Apr 1983).

The αarrow-right-leftβ phase transition in AgI is studied with use of the new molecular-dynamics technique which allows for a dynamical variation of the shape and size of the cell. In the present model, upon heating of β-AgI, the iodine ions undergo a hcp→bcc transformation and silver ions become mobile, whereas the reverse transformation is observed on cooling of α-AgI. The calculated αarrow-right-leftβ transition temperature and structural and dynamical properties are in good agreement with experiments.

45077 **Exact solution of a one-dimensional Ising model in a random magnetic field.** Grinstein, G.; Mukamel, D. (IBM Thomas J. Watson Research Center, Yorktown Heights, New York 10598). *Physical Review [Section] B: Condensed Matter;* **27**: No. 7, 4503-4506(1 Apr 1983).

Analytic results for the free energy, magnetic structure factor, and Edwards-Anderson order parameter of a one-dimensional ferromagnetic Ising model in a random magnetic field are obtained. The structure factor consists of both Lorentzian and Lorentzian-squared terms at all temperatures (T) greater than zero; the Lorentzian-squared terms vanish T = 0. The calculated correlation length agrees with predictions of the Imry-Ma domain argument.

6561 Superconductivity

REFER ALSO TO CITATION(S) 44226, 44245, 44246, 44247, 44249, 44250, 44251, 44252, 44253, 44310, 44908

45078 **Transient flux flow voltages in type II superconductors.** Anjaneyulu, Y.; Joiner, W.C.H.; Lee, J.; Sission, K. (University of Cincinnati, Cincinnati, Ohio 45221). *Journal of Applied Physics;* **54**: No. 6, 3310-3317(Jun 1983). Contract AC02-76ER02890.

Transient flux flow voltage are observed when constant current is switched on in a type II superconductor at low magnetic fields. The nature of the transients is related to the method of formation of the flux line lattice. The transients are attributed to changes which occur in the flux line lattice as inhomogeneities created at the time of formation of the lattice move out of the sample as a result of flux flow. A model is developed to describe this process which includes the requirement that when dissimilar regions of

flux move across the sample, the rate of flow must be the same for these regions, so that an equipotential exists across the sample width. For currents below the equilibrium critical current, excellent fits to this model are obtained for our data.

45079 **Ginzburg-Landau equations, interphase surface energy, and the intermediate state of superconductors with a paramagnetic normal state.** Gray, K.E. (Argonne National Laboratory, Argonne, Illinois 60439). *Physical Review [Section] B: Condensed Matter;* **27**: No. 7, 4157-4160(1 Apr 1983). Contract W-31-109-ENG-38.

The effects of a paramagnetic normal state on the superconducting Ginzburg-Landau (GL) equations, the interphase surface energy σ/sub n/s, and the intermediate-state critical field B/sub c/I of thin films in a perpendicular field are calculated. For a linear H(B) relation, the scaling of λ/sub L/ into λ/sub L//(1+4πchi)/sup 1/2/ introduced by Tachiki et al. is adequate for the GL equations and σ/sub n/s but not for B/sub c/I. For a nonlinear H(B) relation, as might occur for spontaneous ferromagnetism or for fields large enough that the magnetization saturates, neither the GL equations nor σ/sub n/s, nor B/sub c/I, can be obtained by scaling the nonmagnetic case. These results should be applicable to magnetic superconductors such as $ErRh_4B_4$.

6570 Theoretical Physics

REFER ALSO TO CITATION(S) 44436, 44694, 44886, 45037, 45095

45080 **(INIS-mf—7631) Thermodynamic analysis of elastic-plastic deformation.** Lubarda, V. (Titograd Univ. (Yugoslavia)). 1981. 8p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83780897.

The complete set of constitutive equations which fully describes the behaviour of material in elastic-plastic deformation is derived on the basis of thermodynamic analysis of the deformation process. The analysis is done after the matrix decomposition of the deformation gradient is introduced into the structure of thermodynamics with internal state variables. The free energy function, is decomposed. Derive the expressions for the stress response, entropy and heat flux, and establish the evolution equation. Finally, we establish the thermodynamic restrictions of the deformation process.

45081 **(JINR—E-4-81-778) About one Newell's result and the quantum mechanical check of the microcanonical distribution.** Zastavenko, L.G. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics). 1981. 2p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701054.

G.F. Newell succeeded to prove for the eigenfunctions PSIsub(n)(x) of the k-dimensional Schroedinger equation (-Δsub(k)+q(xsub(1), xsub(2)..., xsub(k))-lambdasub(n))PSIsub(n)(x)=0, $\int$/PSIsup(2)(x)/dsup(k)x=1, q(x)>=0, q(x)$\rightarrow$+infinity at x$\rightarrow$infinity the asymptotic relation (lambda$\rightarrow$+infinity) Σsub(lambdasub(n)<=lambda)PHIsub(n)(x)sup(2)=[lambda-q(x)]sup(k/2)x(1+0(1)/(4π)sup(k/2)GITA(1+k/2)). The intent is to attract attention to the fact that the equation is a simple consequence of the classical microcanonical distribution. Thus the Newell result allows one to check the microcanonical distribution hypothesis by the methods of quantum mechanics.

45082 **(UM-P—81/86) Anomalous dimension matrices of four quark operators.** Miller, R.D.C.; McKellar, B.H.J. (Melbourne Univ., Parkville (Australia). School of Physics). 1981. 32p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701055.

One-loop calculations of anomalous dimension matrices for four quark operators are presented. Flavour space indexing determines the nature of the matrices. Four important possibilities are considered for operators with L-L, L-R and R-R chiral structures.

45083 **Optimization of a heat engine based on a dissipative system.** Mozurkewich, M.; Berry, R.S. (Department of Chemistry and the James Franck Institute, The University of Chicago, Chicago, Illinois 60637). *Journal of Applied Physics;* **54**: No. 7, 3651-3661(Jul 1983).

A new class of heat engine is analyzed in which the working fluid operates in a dissipative process, never in equilibrium. The conditions are found for stability and for the generation of work. Then the optimal path is found for operating the general dissipative engine by means of optimal control theory. The optimal cycle consists of arcs of constant power and of approximately instantaneous adiabats. If the heat flow is a function of temperature only, then the constant power arcs become isotherms. An upper bound is found to the power output. Two examples are worked out in detail: a light-driven dissipative engine whose absorption is a step function of temperature, and a light-driven dissipative engine whose working fluid undergoes a chemical reaction (isomerization), absorbing light in the isomeric form favored at high temperatures.

45084 **Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles.** Rosen, H.; Novakov, T. (University of California, Lawrence Berkeley Laboratory, Berkeley, California 94720). *Applied Optics;* **22**: No. 9, 1265-1267(1 May 1983). Contract AC03-76SF00098.

It is unclear why the backscattered radiation from nonabsorbing particles should not make a significant contribution to the optical attenuation measurement. This is especially true where the absorbing component represents only a very small fraction of the aerosol mass. In this Letter we present a simple theoretical model which accounts for all these observations and points out the critical role of the filter substrate as an almost perfect diffuse reflector in the technique.

45085 **Improved semiclassical approximation.** Patrascioiu, A. (Theoretical Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] D: Particles and Fields;* **27**: No. 8, 1798-1802(15 Apr 1983).

A modification of the semiclassical method, applicable in massless theories, is proposed. It is shown that in 0 and 1 dimensions this approximation produces excellent numerical agreement with the exact or otherwise-computed results. The generalization to higher dimensions is discussed.

45086 **Coherent spatial structure versus time chaos in a perturbed sine-Gordon system.** Bishop, A.R.; Fesser, K.; Lomdahl, P.S.; Kerr, W.C.; Williams, M.B.; Trullinger, S.E. (Theoretical Division and Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review Letters;* **50**: No. 15, 1095-1098(11 Apr 1983).

A novel interplay of coherent spatial structure and temporal chaos is reported for the ac-driven, damped sine-Gordon system with breather initial conditions and periodic boundary conditions. The competing tendencies of spatial structures to be stable and of single-particle motions to be chaotic can lead to suppression of chaos, spatio-temporal intermittency, and symmetry-breaking tendencies. Dynamic structure factors provide direct evidence for spatial period halving and renormalized-phonon generation in chaotic regimes.

45087 **Chiral-symmetry breaking in nonequilibrium systems.** Kondepudi, D.K.; Nelson, G.W. (Center for Studies in Statistical Mechanics, University of Texas at Austin, Austin, Texas 78712). *Physical Review Letters;* **50**: No. 14, 1023-1026(4 Apr 1983). Contract AS05-81ER10947.

Sensitivity of a nonequilibrium chemical system to small symmetry-breaking influences is analyzed in the context of chiral-symmetry breaking. For a hypothetical model system, with realistic kinetic constants, a reaction energy barrier difference of $\Delta E/kT = 10^{-17}$—10^{-15} is shown to be sufficient to have a strong chiral selectivity. This is in the range of the estimated energy differences between right- and left-handed molecules due to weak neutral currents.

45088 **Aspects of supersymmetric quantum mechanics.** Cooper, F.; Freedman, B. (Theoretical Division, Los Alamos National Laboratory, Mail Stop B 285, Los Alamos, New Mexico 87545). *Annals of Physics (New York);* **146**: No. 2, 262-288(1 Apr 1983). Contract W-7405-ENG-36.

We review the properties of supersymmetric quantum mechanics for a class of models proposed by Witten. Using both Hamiltonian and path integral formulations, we give general conditions for which supersymmetry is broken (unbroken) by quantum fluctuations. The spectrum of states is discussed, and a virial theorem is derived for the energy. We also show that the euclidean path integral for supersymmetric quantum mechanics is equivalent to a classical stochastic process when the supersymmetry is unbroken ($E_0 = 0$). By solving a Fokker—Planck equation for the classical probability distribution, we find P/sub c/(y) is identical to ' $Psi_0(y)$ '^{2} in the quantum theory.

45089 **Ensemble corrections for the molecular-dynamics ensemble.** Wallace, D.C.; Straub, G.K. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physical Review [Section] A: General Physics;* **27**: No. 4, 2201-2205(Apr 1983).

Expressions are derived which relate the averages of a dynamical variable in the molecular-dynamics ensemble and in the generalized canonical ensemble. Fluctuations in the two ensembles are also related. These results make the full equilibrium theory of classical statistical mechanics accessible to evaluation by molecular-dynamics computations.

45090 **Background pattern removal by power spectral filtering.** Cannon, M.; Lehar, A.; Preston, F. (University of California, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Applied Optics;* **22**: No. 6, 777-779(15 Mar 1983).

A new method for removing periodic background patterns from pictures is presented. The basic spatial frequency composition of the pattern is determined from an estimate of the power spectrum of the picture. A convolutional restoration kernel is then created from a modified version of the power spectrum. The method is extremely effective and can be automated.

45091 **Entropy balance for nonequilibrium steady states.** Feigenbaum, M. (Los Alamos National Lab., NM (USA)); Sertorio, L. (Turin Univ. (Italy). Ist. di Fisica). *Nuovo Cimento [Sezione] B;* **64**: No. 2, 252-260(11 Aug 1981).

In this paper the concept of irreversibility for a finite-size nonequilibrium thermodynamic system is discussed.

6580 Mathematical Physics

45092 **Missing label operators in the reduction O(p)arrow-downO(p-2) x O(2).** Bincer, A.M. (Physics Department, University of Wisconsin, Madison, Wisconsin 53706). *Journal of Mathematical Physics (New York);* **24**: No. 7, 1695-1699(Jul 1983). Contract AC02-76ER00881.

I consider the "missing label" problem for basis vectors of an O(p) representation corresponding to a group reduction chain with links O(p)arrow-downO(p-2) x O(2). A chain with these links is required if the basis vectors are to be of definite weight. I obtain two different sets of missing label operators, which together with the Casimir operators of group and subgroups from a complete set of labeling operators whose eigenvectors provide a canonical basis in the O(p) representation space. The problem is solved for both the even- and odd-dimensional orthogonal groups.

45093 **Matrix formalism for uncertainty analysis.** Smith, D.L. (Applied Physics Division, Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439). *Review of Scientific Instruments;* **54**: No. 7, 818-824(Jul 1983).

A convenient, versatile matrix formalism for uncertainty analysis is discussed, and the concepts are illustrated numerically by means of their application to a hypothetical robot apparatus. The importance of uncertainty correlations is emphasized in this treatment which is based upon well-known statistical laws that govern experimental observations.

45094 **Fractal basin boundaries, long-lived chaotic transients, and unstable-unstable pair bifurcation.** Grebogi, C.; Ott, E.; Yorke, J.A. (Laboratory for Plasma and Fusion Energy Studies and Department of Physics and Astronomy, University of Maryland, College Park, Maryland 20742). *Physical Review Letters;* **50**: No. 13, 935-938(28 Mar 1983).

A new type of bifurcation to chaos is pointed out and discussed. In this bifurcation two unstable fixed points or periodic orbits are created simultaneously with a strange attractor which has a fractal basin boundary. Chaotic transients associated with the coalescence of the unstable-unstable pair are shown to be extraordinarily long-lived.

45095 **Large symmetric π transformations for Hadamard transforms.** Fenimore, E.E. (University of California, Los Alamos National Laboratory, Los Alamos, New Mexico 97545). *Applied Optics;* **22**: No. 6, 826-829(15 Mar 1983).

Many multiplexing instruments utilize the fast Hadamard transform (FHT) to demultiplex the signal. In the past, the HFT includes the π_1 and π_2 transformations to reorder vectors before and after a Sylvester-type Hadamard transform. Although the computational effort involved in the π_1 and the Sylvester-type Hadamard transform scales as $n \log_2 n$, calculating the π_2 transformation (which only has to be done once) scales as n^2. Recently Gunson (1980) has suggested a method by which the π transformations are symmetric, that is $\pi_2 = \pi_1$. We have calculated a complete set of symmetric π transformations for FHT of sizes 2^3 to 2^{20}. Special emphasis has been placed on the phase of the π transformation so as to have the correct phase in the demultiplexed signal.

70 FUSION ENERGY

7001 Plasma Research

REFER ALSO TO CITATION(S) 44533, 44892, 45213, 45214, 45242, 45243, 45258, 45261, 45265, 45283

45096 (CONF-830654—, pp 38-52) **ECH current drive on the ISX-B tokamak.** Levine, J.S. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45097 (CONF-830654—, pp 53-68) **PDX ECRH.** Bowen, N. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45098 **(DOE/ER/53131—4) Study of transport mechanisms for energetic-ion heating of INTOR-size tokamaks. Final technical report, 2 June 1982-31 May 1983.** Drummond, W.E. (Austin Research Associates, Inc., TX (USA)). Jun 1983. Contract AC05-82ER53131. 102p. (COO—3131-4). NTIS, PC A06/MF A01. Order Number DE83015116.

Portions are illegible in microfiche products.

The injection of 28-MeV singly-charged Neon ions appears to offer an efficient heating mechanism for large, INTOR-size tokamaks. Analysis has shown that such ions, injected parallel to the main magnetic field at a midplane point roughly one meter on the outboard side of the confined plasma, execute a drift-orbit motion that carries them deep into the plasma. A computational modeling of the subsequent stripping and transport show 98% of such ions will be well confined, with a broad heating profile peaked near the plasma center. The confinement and heating profiles are relatively insensitive to initial injection parameters, indicating an adequate phase-space acceptance window for injection. Preliminary engineering studies have shown transport can be achieved through the main field coils using a passive superconducting shielding system. Because of the orientation of the shielding system relative to the reacting plasma, line-of-sight shine-through is avoided.

45099 **(DOE/ER/53140—9) Monte Carlo studies of tandem-mirror plasmas interacting with waves in the ion-cyclotron range of frequencies (ICRF). Progress report, April 1, 1983-June 30, 1983.** Todd, A.M.M. (Grumman Aerospace Corp., Princeton, NJ (USA)). Jun 1983. Contract AC02-82ER53140. 4p. NTIS, PC A02/MF A01. Order Number DE83015193.

We have embarked upon a new phase of production calculations using the modified version of our Monte Carlo simulation code. Problems under investigation include central-cell heating TARA and TMX-U, hot-electron anchor operation in TARA, and rf fueling in MARS. We are also in the process of formulating Monte Carlo scattering operators for non-Maxwellian backgrounds, and multiple-event operators for rf and scattering to be used on hot goosed particles and very cold particles.

45100 **(DOE/ET/5101\3—80) Internal modes in high-temperature plasmas.** Crew, G.B. (Massachusetts Inst. of Tech., Cambridge (USA). Plasma Fusion Center). Feb 1983. Contract AC02-78ET51013. 152p. (PFC/RR—83-10). NTIS, PC A08/MF A01. Order Number DE83015424.

The linear stability of current-carrying toroidal plamsas is examined to determine the possibility of exciting global internal modes. The ideal magnetohydrodynamic (MHD) theory provides a useful framework for the analysis of these modes, which involve a kinking of the central portion of the plasma column. Non-ideal effects can also be important, and these are treated for high-temperature regimes where the plasma is collisionless.

45101 **(DOE/ET/53004—51) Space potential, temperature, and density profile measurements on RENTOR.** Schoch, P.M. (Rensselaer Polytechnic Inst., Troy, NY (USA). Plasma Dynamics Lab.). May 1983. Contract AC02-76ET53004. 177p. NTIS, PC A09/MF A01. Order Number DE83015594.

• Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Radial profiles of the space potential, electron temperature, and density have been measured on RENTOR with a heavy-ion-beam probe. The potential profile has been compared to predictions from a stochastic magnetic field fluctuation theory, using the measured temperature and density profiles. The comparison shows strong qualitative agreement in that the potential is positive and the order of T/sub e//e. There is some quantitative disagreement in that the measured radial electric fields are somewhat smaller than the theoretical predictions. To facilitate this comparison, a detailed analysis of the possible errors has been completed.

45102 **(DOE/ET/53088—96) Heat conduction process in tokamak hot-ion plasmas.** Ware, A.A. (Texas Univ., Austin (USA). Inst. for Fusion Studies). Jun 1983. Contract FG05-80ET53088. 46p. NTIS, PC A03/MF A01. Order Number DE83014884.

The two-component ion distribution observed with active charge-exchange measurements on PDX are explained using the Fokker-Planck drift-kinetic equation and assuming ion self collisions are dominant for energy scattering. The energetic tail of the distribution, which is diffusing outwards in radius and down in energy, must retain an approximately constant effective temperature T/sub H/ = (- ∂ l n f/sub i//m∂ϵ)$^{-1}$. The discontinuity in the slope of ln f/sub i/ is shown to be the boundary between the inward and outward diffusion parts of f/sub i/ and is a form of contact discontinuity. Energy-scattering collisions with electrons or circulating-beam ions, when important, modify the constancy of T/sub H/.

45103 **(DOE/PR/06010—T32) Determine atomic data pertinent to the magnetic-fusion-energy program for one-half of FY 1984.** Wiese, W.L. (National Bureau of Standards, Washington, DC (USA)). 1983. Contract AI01-76PR06010. 10p. NTIS, PC A02/MF A01. Order Number DE83014022.

Brief descriptions of work are given for each of the following topics: (1) identification of atomic spectral lines, (2) atomic energy level compilations, (3) transition rate measurements with the theta pinch and TEXT experiments, (4) dielectronic recombination rates, (5) electron-ion collision experiments, (6) electron impact excitation theory, and (7) for uv radiometric standards. (MOW)

45104 **(EFI—503(46)-81) Modulation instability in a plasma-electron beam system.** Atsagortsian, K.Z.; Elbakian, S.S. (Erevanskij Fizicheskij Inst. (USSR)). 1981. 20p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702859.

Behaviour of the nonlinear wave of small but finite amplitude arising in the plasma-beam system when passing through the monoenergetic electron beam plasma is studied using the method of Krylov-Bogolyubov-Mitropolsky. For the excited wave amplitude the Schrodinger nonlinear equation is obtained proceeding from which the condition of modulational stability or instability of the plane monochromatic wave is obtained.

45105 **(IAE—3439/8) Program for numerical calculation of the plasma parameters in a tokamak reactor with fast atom beam injection.** Vikhrev, V.V.; Proshin, M.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 52p. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83702860.

The paper is a manual for numerical calculation of the plasma parameters in tokamak devices with fast atom injection. The aim of the manual is prompt and elementary study and application of such calculations, which are widely used to investigate the processes in tokamak devices. Plasma model, that takes into account the processes in tokamak devices, is used; derivation of equations of power balance in finite differences and a program for calculation in FORTRAN are presented; numerical solution technique is described. Specifications of the UWMAK-1 tokamak reactor are presented as a calculation example.

45106 **(IAE—3477/7) Experimental study on flute oscillations in an open trap with magnetic field minimum.** Arsenin, V.V.; Zhil'tsov, V.A.; Kosarev, P.M.; Makashin, I.N.; Panov, D.A.; Skovoroda, A.A.; Shcherbakov, A.G. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 323p. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83702861.

Characteristics of low frequency (LF) oscillations of low density plasma ωsub(pi) <= ωsub(ci) where ωsub(pi) and ωsub(ci) are ion plasma and cyclotron frequencies, respectively, have been experimentally investigated. Experiments were carried out in the "Ogra-3B" simple mirror. LF-oscillations of 1-500 kHz were recorded by electrostatic antennas (including mobile ones) located near plasma surface. The antennas allowed to measure the mode structure and oscillation amplitude out of plasma. To measure oscillation characteristics in plasma cold ion and electron flux fluctuations behind the mirrors along line of force have been recorded. The experiments carried out show that intensive LF-oscillations may be excited in open traps with minimum B. LF-oscillation generation is accounted for within the frames of a simple model of plasma column natural forced flute oscillations. The waves are excited by injected beam current fluctuations at density below the threshold of high-frequency (HF) oscillation origination and by HF-oscillations at higher densities near cyclotron frequencies.

45107 **(IC—82/72) Acoustic plasma wave in inversion layers and sandwich structures.** Mishonov, T.; Sariisky, T. (International Centre for Theoretical Physics, Trieste (Italy)). Jun 1982. 7p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703395.

The collective excitations in inversion layers and sandwich structures have been investigated. It is shown that anomalous acoustic plasmons could exist in inversion layers if more than one surface sub-band is occupied. The conditions for the absence of attenuation have been defined. The plasma waves in a finite layered structure are briefly discussed.

45108 **(IC—82/152) Kinetic theory of parametric resonance in relativistic plasma.** El-Ashry, M.Y. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1982. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703393.

The instability of relativistic hot plasma located in high-frequency external electric field is studied. The dispersion relation, in the case when the plasma electrons have relativistic oscillatory motion, is obtained. It is shown that if the electron Deby's radius is less than the wave length of plasma oscillation and far from the resonance on the overtones of the external field frequency, the oscillation build-up is possible. It is also shown that taking into account the relativistic motion of electrons leads to a considerable decrease in the frequency at which the parametric resonance takes place.

45109 **(IC—82/166) Surface density profile and surface tension of the one-component classical plasma.** Ballone, P.; Senatore, G.; Tosi, M.P. (International Centre for Theoretical Physics, Trieste (Italy)). Aug 1982. 19p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703394.

The density profile and the interfacial tension of two classical plasmas in equilibrium at different densities are evaluated in the square-density-gradient approximation. For equilibrium in the absence of applied external voltage, the profile is oscillatory in the higher-density plasma and the interfacial tension is positive. The amplitude and phase of these oscillations and the magnitude of the interfacial tension are related to the width of the background profile. Approximate representations of the equilibrium profile by matching of its asymptotic forms are analyzed. A comparison with computer simulation data and a critical discussion of a local-density theory are also presented.

45110 **(ILE—8120P) Characteristics of transported ion beam in laser-initiated plasma channels.** Ozaki, T.; Miyamoto, S.; Imasaki, K.; Fujita, H.; Nakai, S. (Osaka Univ., Suita (Japan). Inst. of Laser Engineering). 7 Aug 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702867.

The propagation of intense ion beams through the laser-initiated plasma channel is reported. The ion beam was generated using a pinch-reflex ion diode on Reiden IV generator and transported over 40 cm in the plasma channel. Beam orbits, estimated from the pattern on the detector-film with energy resolution, were in good agreement with a predicted theory.

45111 **(ILE—8132P) Finite size fluid particle in nonuniform moving grid.** Nishiguchi, A.; Yabe, T. (Osaka Univ., Suita (Japan). Inst. of Laser Engineering). 16 Nov 1981. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702871.

The particle-in-cell (PIC) method, which is known as mixed Eulerian-Lagrangian scheme, has been applied successfully to solve a wide variety of problems in which the fluid distortion is large. In this paper, a new type of the PIC method is presented. Area-weighting technique and a nonuniform-spacing, moving grid were employed for the suppression of nonphysical fluctuation and for the description of large density variation with few particles, respectively. The reduction of numerical viscosity is discussed. In a basic scheme, the equations for one compressible fluid were used. In the present approach to the PIC method, a particle has the memories for its own mass, position and internal energy, but momentum is attached to the particle only when it moves, in order to evade the multistreaming problem. An essential point is that a particle preserves the memory of the cell boundary lines when it moves. As the examples, one-dimensional adiabatic expansion process and the Rayleigh-Taylor instability were analyzed. The results showed that the new PIC method is useful for the description of large density variation with few particles as well as for the cases known to be powerful in Harlow's PIC method. Nonphysical noise, numerical thermal diffusion and viscosity were successfully reduced. A non-uniformly-spacing, moving grid system can be used for the local fine resolution of processes.

45112 **(INDC(NDS)—136/GA) First research coordination meeting on atomic collision data for diagnostics of magnetic fusion plasmas, Vienna, 21-25 June 1982. Summary report.** Katsonis, K.; Lorenz, A. (International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee). Oct 1982. 101p. (CONF-8206191—Summ.). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83702872.

From 1. IAEA research coordination meeting on atomic collision data for diagnostics of magnetic fusion plasmas; Vienna, Austria (21 Jun 1982).

Proceedings of the first meeting of the participants in the IAEA Coordinated Research Programme on atomic collision data for diagnostics of magnetically confined fusion plasmas, convened by the IAEA Nuclear Data Section on 21 - 25 June 1982, at IAEA Headquarters in Vienna. The meeting participants reviewed the status of electron excitation, electron ionization and charge transfer data for selected fusion relevant elements, made specific recommendations on the use of these existing data, and identified those data which needed to be measured or calculated.

45113 **(IPPCZ—242) Interaction of an electromagnetic wave with an inhomogeneous plasma slab.** Lacina, J.; Preinhaelter, J. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Jul 1982. 21p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702874.

In connection with the problem of plasma heating by high-frequency waves a numerical code was developed which makes it possible to study the incidence of an electromagnetic wave on an inhomogeneous plasma slab. Using a one-dimensional model, non-magnetized plasma is described by means of two-fluid equations with finite electron pressure and with the adiabatic condition for all processes. It is shown that at normal incidence of a wave on a cold plasma, the wave is reflected from the region of plasma resonance. A standing wave arises which generates an electrostatic standing wave of a double frequency. At the same time the density gradient sharply rises in this region. In a warm plasma the incident wave again creates a standing wave but nonlinear perturbations propagate from the region of plasma resonance at ion acoustic velocity to the whole plasma volume. In this case the density gradient does not change very much. In the region of plasma resonance ion acoustic waves are also generated.

45114 (IPPCZ—244, pp 14-28) **Investigation of lower hybrid resonance heating in tokamak FT-1 and FT-2.** Dmyachenko, V.V. (AN SSSR, Leningrad. Fiziko-Tekhnicheskij Inst.). Oct 1981. (In Russian). NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The results are reported of experiments with lower hybrid resonance heating performed in the FT-1 tokamak at the A.F. Ioffe Physical-Technical Institute in Leningrad. The specifications of the FT-1 and FT-2 tokamaks are given and the diagnostic systems used are described. For the excitation of slowed-down waves a special "comb" structure was developed. At hf power comparable to that of the Joule heating no disturbance of the overall plasma balance and stability was observed. The experiments showed efficient energy transfer into the plasma. Up to 50% of the hf power is absorbed by electrons in the lower hybrid resonance (LHR) region, and up to 30% by accelerated ions. The following factors limit heating efficiency: The non-identity of the LHR zone and the discharge axis, a rise in plasma density during the heating pulse accompanied by cooling of the discharge periphery, and bad ion confinement due to a small discharge current. The experiments will continue in the FT-2 tokamak with hf power exceeding 2-3 times that of Joule heating.

45115 (IPPCZ—244, pp 29-33) **High-frequency plasma heating in tokamak FT-1 at overcritical density. I.** Baranov, Yu.F.; Bulyginskij, D.G.; Golant, V.E. (AN SSSR, Leningrad. Fiziko-Tekhnicheskij Inst.). Oct 1981. (In Russian). NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Experiments are reported with additional plasma heating by electron cyclotron (EC) waves performed in the FT-1 tokamak. The waves were generated by an 80 kW/29 GHz gyrotron. Two experimental arran.oements (the hf power input being located either on the inner side of the torus or on the outer side of it) are compared with regard to heating efficiency. The inner power input makes it possible to heat a rather dense plasma. The heating efficiency remains almost constant up to plasma densities

n=2.5nsub(crit), exceeding almost twice that obtained with the outer power input. The energy deposited in the plasma was evaluated from the measured radial profiles of plasma temperature. The experimental results were compared with a numerical simulation of wave energy absorption along wave trajectories. In a dense plasma, the waves are reflected many times before reaching the electron cyclotron resonance (ECR) and upper hybrid resonance (UHR) regions. The role of ECR absorption is rather small in the reported experiment, most of the hf energy being absorbed via linear transformation of EC waves into plasma waves in the UHR region.

45116 (IPPCZ—244, pp 34-36) **High-frequency plasma heating in tokamak FT-1 at overcritical density. II.** Bulyginskij, D.G.; Golant, V.E.; Goncharov, S.G.; Gusev, V.K.; Larionov, M.M.; Levin, L.S.; Razdobarin, G.T.; Smirnov, A.N.; Shustova, N.V. (AN SSSR, Leningrad. Fiziko-Tekhnicheskij Inst.). Oct 1981. (In Russian). NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45117 (IPPCZ—244, pp 37-38) **Lower-hybrid heating experiment on the TM-1-MH tokamak.** Datlov, J.; Jakubka, K.; Kopecky, V.; Koerbel, S.; Kryska, L.; Magula, P.; Stoeckel, J.; Zacek, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

During preliminary experiments with plasma heating in the lower hybrid resonance (LHR) region, high frequency power up to 100 kW was launched into the tokamak by a loop fed by a coaxial line. The hf field-plasma interaction was strongly nonlinear in the power range 3 to 100 kW and took place predominantly at the plasma periphery. LHR heating experiments with a clystron power source and a simple loop coupler were started recently. The highly nonlinear nature of the wave-plasma interaction is demonstrated by a broad down-shifted spread of high frequency spectra, low frequency oscillations being generated by parametric instabilities. The threshold power for the ion heating effect is apparently lower than the lowest power used in the experiment. The density increase observed during the heating pulse was almost removed by raising the liner temperature up to 300 degC. The heating efficiency for ions remains the same as that with a cold liner (about 10%). This relatively low value is explained by the existence of a strong nonlinear absorption on the plasma periphery.

45118 (IPPCZ—244, pp 47-51) **Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation.** Klima, R.; Pankratov, I.M.; Pavlo, P.; Petrzilka, V.A. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Nonlinear density modulation is investigated theoretically due to ponderomotive forces of high-frequency fields in connection with experiments on lower hybrid resonance heating of a tokamak plasma. The external magnetostatic field is assumed to be perpendicular to the plasma density gradient. The high-frequency field is launched from a waveguide array separated from the plasma by a thin vacuum region. The wave equation for steady-state propagation of lower hybrid waves is transformed into a set of equations for the first and third Fourier components of the wave amplitude. In their numerical solution it is assumed that the nonlinearity becomes negligible at some distance from the plasma boundary. For illustration, spatial profiles of wave amplitudes are shown. The third harmonic generation is stronger with steeper plasma gradients and with shorter wavelengths. The nonlinear variations of the weaker first harmonic component can reach 40%.

45119 (IPPCZ—244, pp 52-53) **Electron impact ionization of highly charged molybdenum impurities in tokamak plasmas.** Strzondala, V. (Vysoka Skola Banska, Ostrava (Czechoslovakia)). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45120 (IPPCZ—244, pp 54-55) **Andromeda - the system for the acquisition and numerical data processing and its application for experimental device tokamak TM-1-MH.** Kryska, L.; Koerbel, S. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45121 (IPPCZ—244, pp 56-59) **Soft X-ray diagnostics on tokamak TM-1-MH.** Magula, P. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45122 (IPPCZ—244, pp 60-64) **Energy balance in TM-1-MH tokamak (ohmical heating).** Stoeckel, J.; Koerbel, S.; Kryska, L.; Kopecky, V.; Badalec, V.; Datlov, J.; Jakubka, K.; Magula, P.; Zacek, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu); Pereverzev, G.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45123 (IPPCZ—244, pp 65-76) **Experimental investigation of high-current REB interaction with plasma.** Kruglyakov, Eh.P. (AN SSSR, Novosibirsk. Inst. Yadernoj Fiziki). Oct 1981. (In Russian). NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Experimental investigation is performed of the interaction of high-current relativistic electron beams with plasma at the Institute of Nuclear Physics in Novosibirsk within the long solenoid thermonuclear reactor program. Physical problems of the beam transport and beam energy deposition in a plasma with electron density up to $10^{15}cm^{-3}$ are studied on the INAR and GOL-1 experimental facilities. The collected experimental material together with the present theoretical notions clearly indicate the physical processes accompanying the injection of a high-power electron beam into a plasma. The beam relaxation and plasma heating is governed by collective processes. During the interaction most of the energy is transferred into a small group of high-energy plasma electrons. Relatively high energy transfer efficiency exceeding 30% has been achieved. The interaction can effectively be suppressed by plasma inhomogeneity. All experimental results coincide with the strong Langmuir turbulence concept.

45124 (IPPCZ—244, pp 77-93) **Computer simulations of reflex E-beam systems and plasma.** Jungwirth, K.; Stavinoha, P. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The dynamics was numerically studied of electrons and ions in systems with virtual or reflex cathodes by means of 1.5-dimensional PIC simulation model OREBIA-REX in close correlation with the experimental work on relativistic high-current electron beam and ion beam generation. The results of numerical simulation of the formation and relaxation of an oscillating electron beam are discussed. A possible explanation is given of the enhanced energy deposition observed in the REBEX experiment with short plasma columns. Planar reflex diodes and symmetrical reflex triodes, coupled to an external circuit and operated with and without ions, are investigated. In regimes with ions, besides fast oscillations of the diode (triode) voltage and current, slower oscillations due to electron-ion relaxation processes also appear, even leading to periodical collapses of the high-voltage triode. Phase-space diagrams illustrat-

ing the motion of particles and time-dependent contour maps of electric field strength and potential are presented.

45125 (IPPCZ—244, pp 101-102) **Development of current sheat on output of coaxial gun.** Kravarik, J.; Kubes, P.; Hruska, J. (Ceske Vysoke Uceni Technicke, Podebrady (Czechoslovakia). Fakulta Elektrotechnicka). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45126 (IPPCZ—244, pp 112-113) **Soft X-ray and VUV emission from REB-heated plasma in Rebex 1 and Rebex 2 machines.** Piffl, V.; Raus, V. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45127 (IPPCZ—244, pp 114-115) **Dynamical model of an overheated magnetized plasma.** Jungwirth, K.; Ullschmied, J. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

A theoretical model describing the dynamics of an overheated plasma column in an external longitudinal magnetic field was developed in connection with the problem of the correct interpretation of diamagnetic data in experiments on plasma heating by pulsed relativistic electron beams. Various energy transfer channels and loss mechanisms are accounted for. By solving a set of equations, consisting of the energy conservation law. magnetic flux conservation equations, equation of motion of the plasma boundary and thermodynamic equation for the expanding plasma column, analytical expressions for the time-dependent plasma cross-sectional area, diamagnetic signal and all energy components are derived. Conditions for excitation of magnetoacoustic oscillations are specified. It is shown that the energy deposited per unit length of the system can be evaluated independently of the energy transfer channel.

45128 (IPPCZ—244, pp 118-125) **Dynamics of ionization and transport in a magnetically confined plasma column.** Prinzler, H.; Heymann, P. (Akademie der Wissenschaften der DDR, Berlin. Zentralinstitut fuer Elektronenphysik). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Transport processes in a magnetized low-temperature plasma were investigated and the results compared with the classical ambipolar diffusion and dissipative drift wave concepts. The nearly quiescent helium plasma was disturbed by periodic rectangular hf pulses and the propagation of density perturbations in the radial direction was studied. A striking similarity of the observed density dependence with that calculated assuming drift wave dispersion was found. The density perturbation drives a spectrum of drift waves which is continuous for a single-step function and discrete for periodic disturbances. The waves propagate according to the linear drift wave dispersion relation, although the disturbed plasma is stable. No perpendicular diffusion waves were observed. The estimated value of the total diffusion coefficient is four times the classical one.

45129 (IPPCZ—244, pp 126-127) **Time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device.** Popescu, I.I.; Vlad, M. (Institutul de Fizica si Tehnologia Aparatelor cu Radiatii, Bucharest (Romania)). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45130 (IPPCZ—244, pp 128-129) **Apparatus for plasma electron temperature and density measurements by Thomson scattering.** Kolacek, K.; Babicky, V. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45131 (IPPCZ—244, pp 130-134) **Diagnostics of nonequilibrium hydrogen plasma.** Ferdinand, J. (Vysoka Skola Strojni a Elektrotechnicka, Plzen (Czechoslovakia)). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The electron temperature of a low-density hydrogen plasma was evaluated from the measured intensity ratios of spectral lines of the Balmer series. The results were checked by the double-probe method. For calculating the theoretical values of intensity ratios in the temperature range 20,000 to 50,000 K, both the coronal and the collisional-radiative models of a plasma were used. The electron temperature determined by using the coronal model data agrees well with that obtained from the double-probe measurements, with the only exception of the H-gamma to H-beta intensity ratio. Comparing the experimental values with those obtained from the collisional-radiative model suggests that the electron densities of the investigated discharge are lower than 10^{9} cm^{-3}.

45132 (IPPCZ—244, pp 137-138) **Pseudo-spectral numerical solution of the Korteweg-de Vries equation.** Sedlacek, Z. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45133 (IPPCZ—244, pp 139-142) **Magnetic scalar potentials.** Sestak, B. (Vysoka Skola Strojni a Elektrotechnicka, Plzen (Czechoslovakia)). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The collisional integral of the Fokker-Planck equation for a two-component magnetized plasma is expressed in terms of two scalar potentials. For the external magnetic field approaching zero these magnetic potentials are reduced to the generalized Rosenbluth potentials. Integral functions which determine the magnetic scalar potential can analytically be found for an arbitrary interaction potential of plasma components. Analytical expressions for magnetic potentials are derived in the case of Coulomb collisions of Maxwell-distributed electrons and ions.

45134 (IPPCZ—244, pp 149-152) **Generalization of barometric formula for a sollisional plasma in a magnetostatic and rf fields.** Klima, R.; Krlin, L. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

A modification is derived of the barometric formula, describing the plasma density modulation due to nonlinear ponderomotive forces of rf fields implied by collisional diffusion. A one-dimensional model of a fully-ionized plasma is used for simplification. The viscosity and inertia of electrons and the influence of rf fields on ions are neglected. The generalized barometric formula is found as a solution of the Bernoulli-type equation for plasma density derived from the general theory of hydrodynamics. The influence of rf fields on particle fluxes and plasma density is discussed.

45135 (IPPCZ—244, pp 153-156) **Simulation code of relativistic electron beam diodes.** Vrba, P. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The countercurrent flow of relativistic electrons and ions in an externally applied electric and magnetic field or in their own field inside a cylindrical high-voltage diode are studied numerically by a two-dimensional finite-size particle computer model. The simulation is based on the self-consistent solution of a set of differential equations consisting of the force equations for relativistic electrons and for ions, the Poisson equation for the self-potential and the equation for the internal magnetic field. The computer code developed in the IBM 370/135 programming system calculates the trajectories of electrons and ions in the self-consistent fields near the maximum of the applied voltage pulse. A diagram of the computer code is shown, the basic cycle is described and results of a preliminary test of the code are presented.

45136 (IPPCZ—244, pp 157-159) **Helium population model.** Slavik, J. (Vysoka Skola Strojni a Elektrotechnicka, Plzen (Czechoslovakia)). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Elementary processes in helium plasma are studied numerically within the framework of the radiation-scattering model. The energy states scheme used consists of ten states of the parahelium subsystem, six states of orthohelium, and the quasicontinuum state. The excitation and deexcitation due to electron collisions, to electron ionization and corresponding three-body recombination, to emission and absorption of photons, to photoionization and corresponding radiative recombination are taken into account. The global population coefficients and radiation-scattering velocities for the parahelium subsystem are computed using the TESLA 200 computer. The energy region studied is 1 to 10 eV. For electron energies up to 2 eV the populations are given by the electron-gas density and the excited states are underpopulated with respect to Saha equilibrium. For higher energies the influence of the ground and metastable states becomes more pronounced. For electron densities above 10^{14} cm^{-3} the populations approach thermal equilibrium.

45137 (IPPCZ—244, pp 160-162) **Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma.** Lacina, J.; Preinhaelter, J. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45138 **(IPPJ—550) Observation of spatial alfven resonance.** Tsushima, A.; Amagishi, Y.; Inutake, M. (Nagoya Univ. (Japan). Inst. of Plasma Physics). Nov 1981. 13p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702875.

Axisymmetric Alfven waves are excited by Stix coils to investigate the spatial properties of shear Alfven resonance. The maximum azimuthal magnetic field of excited waves is located at Alfven resonance layer, which is a function of both frequency and wavelength. The polarization also changes continuously from right-hand to left-hand rotation through the resonance layer.

45139 (IPPJ-REV—1, pp 85-127) **Nonlinear theory of drift instability.** Hatori, T. (Nagoya Univ. (Japan). Inst. of Plasma Physics). Jul 1981. NTIS (US Sales Only), PC A07/MF A01.

In Theory of drift instabilities and the associated anomalous transport.

In this chapter, we review recent works on the analytical and numerical analysis for the nonlinear evolution of drift instabilities. Only the case of a coherent wave is considered. Contributions to the turbulence theory for drift instabilities are already presented in Chapter 4.

45140 (IPPJ-REV—1, pp 11-31) **Linear theory of drift instability.** Tuda, T. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment). Jul 1981. NTIS (US Sales Only), PC A07/MF A01.

In Theory of drift instabilities and the associated anomalous transport.

Drift wave instability was studied theoretically. Low frequency waves are influenced by plasma inhomogeneity when the phase velocity of the waves perpendicular to magnetic field is comparable to the drift velocity. The low-β plasma in a homogeneous magnetic field B parallel to z-axis was considered for the analysis, and it was assumed that the plasma density varies along X-axis. Electrostatic fluctuations were assumed. The dispersion relation of drift waves was derived from the continuity equation of ions. If Coulomb collisions or resonant particles prevent electrons from following the Boltzmann distribution, various free energy sources make the drift waves unstable. The effects of resonant particles and finite Larmor radii were examined with the Vlasov equation. The stability analysis of the drift mode in a sheared magnetic field has been one of the important objects of thermonuclear fusion researches. A model magnetic field was considered and analyzed. The stability of the drift mode in toroidal systems was studied.

45141 (IPPJ-REV—1, pp 33-45) **Phenomenological theory of the anomalous transport in tokamaks.** Wakatani, M. (Kyoto Univ., Uji (Japan). Plasma Physics Lab.). Jul 1981. NTIS (US Sales Only), PC A07/MF A01.

In Theory of drift instabilities and the associated anomalous transport.

The diagnostics in tokamak systems make it possible to detect microscopic density fluctuation. Measurements suggest that the density fluctuation may be related to drift wave turbulence. The correlation between the fluctuation and the anomalous transport in tokamaks is discussed in this paper. For the collisional drift waves in a weakly-sheared magnetic field, the diffusion coefficient was estimated by Kadomtsev and Pogutse. As the physical mechanism of the anomalous transport, the drift motion due to the electric field produced by drift waves has been usually considered. There are two other mechanisms to study the anomalous transport. The anomalous transport due to convective cells was pointed out to explain some of tokamak experiments. Another mechanism is the contribution of braided magnetic surfaces to energy and particle transport. It was pointed out that electron heat transport became anomalous in braided magnetic surfaces.

45142 (IPPJ-REV—1, pp 47-84) **Kinetic theory of the anomalous transport.** Tange, T. (Hiroshima Univ. (Japan)). Jul 1981. NTIS (US Sales Only), PC A07/MF A01.

In Theory of drift instabilities and the associated anomalous transport.

This paper presents review on the effect of the drift wave turbulence on various transport fluxes in toroidal plasma. The general expression for the plasma transport fluxes in terms of the correlation functions for electromagnetic fluctuation was obtained. The principal assumption is that the scale length of the inhomogeneity is large as compared with the ion Larmor radius. The transport fluxes considered were the particles, momentum and heat fluxes across a magnetic field. The model used was a slab model with a constant magnetic field in Z-direction. The obtained formulation gives the basis for the investigation of the anomalous transport, and is valid for arbitrary low-frequency perturbation. The effect of tokamak magnetic geometry on diffusion flux is discussed. In order to determine the magnitude of diffusion flux theoretically, the fluctuation spectrum must be studied, and the weak turbulence theory of the drift waves was introduced. Within the framework of the weak turbulence theory, the impurity diffusion due to the ordinary drift waves was considered. The electron heat flux produced by the linear Landau damping process was estimated. The electron energy flux may have the same anomaly as particle diffusion flux. The ion heat flux was also evaluated. The finite-β effect, that is, the electromagnetic effect on the transport caused by drift wave turbulence did not markedly enhance the electron heat transport.

45143 **(IPPJ-REV—1) Theory of drift instabilities and the associated anomalous transport.** (Nagoya Univ. (Japan). Inst. of Plasma Physics). Jul 1981. 138p. NTIS (US Sales Only), PC A07/MF A01. Order Number DE83780864.

Separate abstracts were prepared for each of the included papers. (MOW)

45144 (JINR—9-82-13) Bywalled plasma formation in vacuum prolonged channels. Korenev, S.A.; Rubin, N.B. (Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods). 1982. 7p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702106.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 6 figs.; submitted to the journal Sov. Phys. - Tech. Phys.

To produce homogeneous along the channel length plasma the application of incomplete rate-in surface dielectric discharge for generating the bywalled plasma in prolonged cylindrical channels at a pressure of the residual gas of P approximately 10^{-5} Torr is proposed. Experimental set-up consisted of a pulse voltage generator and a plasma channel. The plasma channel was a coaxial system of three tubes inserted into each other. The first outer tube is made of a stainless steel, the second - of a dielectric material, the third - of smallsized stainless steel greed. It is demonstrated that the plasma being formed in the process is sufficiently homogeneous by concentration of the components, by the channel length and azimuth. The length of the experimental channel under investigation was 1.6 m, its diameter amounted 0.05 m. The maximum concentration of electron component was 10^{17} m^{-3}.

45145 (KFTI—82-1) Automatization of ultrahigh frequency measurement methods of characteristics of pulsed plasma processes on-line with the M-7000 computer. Pinos, I.B.; Sizaya, E.N.; Skibenko, A.I.; Taran, V.S.; Fomin, I.P. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 28p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702876.

Automatization problems of two types of UHF interferometers: traditional two-arm interferometers and modulation interferometers are considered. By means of an automatic measuring system signal measurement from UHF detectors and storage in the autonomous buffer memory unit has been realized. Scanning and transmission of measured signals to the computer have been performed in the interval between working facility pulses. Plasma investigations are carried out at the pulse reflection discharge. Automatic signal measurement from interferometers and program-mathematical processing performed at the M-7000 computer permit to effectively determine: phase runs on and average plasma density by measurement results by a usual interferometer, spectral characteristics of plasma density fluctuations, spatial plasma density distribution during two-hour sounding, phase runs on for interferometers with reference and working interferometer modulation. Realization of experimental investigations of plasma characteristics by means of a described measuring system permits to exclude the labour-consuming photoregistration stage, to improve the accuracy and effectively obtain final results.

45146 (ORNL/TM—8234) TEDIT, a computer code for studying the time evolution of drift instabilities in a torus. van Rij, W.I.; Beasley, C.O. Jr. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 33p. NTIS, PC A03/MF A01. Order Number DE83014890.

TEDIT is an initial-value program that calculates the time evolution of drift instabilities in a toroidal plasma with shear and in a slab-geometry approximation. The electron and ion kinetic equations are advanced in time, with the electrostatic potential phi and vector potential A/sub parallel/ calculated from quasi-neutrality and Ampere's law, respectively.

45147 (ORNL/TM—8699) Simulation of inertial and beam-driven effects on impurities in tokamak plasmas. Crume, E.C. Jr. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 34p. NTIS, PC A03/MF A01. Order Number DE83014892.

Experiments on beam-heated tokamak plasmas in the Impurity Study Experiment (ISX-B) indicate that counterinjection leads to enhanced accumulation of impurities and coinjection leads to reduced accumulation of impurities relative to ohmically heated plasmas. According to neoclassical theory, both inertial and beam-driven effects can modify impurity distributions in beam-heated plasmas. We have implemented treatments of these effects in our basic impurity transport simulation code, IMPTAR, in order to investigate whether these effects could account for the observations in ISX-B. We briefly review the neoclassical theory of these effects and infer various consequences. We then present simulation results for model coinjected and counterinjected ISX-B plasma with inertial and beam-driven effects treated both separately and together.

45148 (PPPL—1939) Current-drive experiments on the PLT Tokamak. Jobes, F.; Bernabei, S.; Efthimion, P.; Hooke, W.; Hosea, J.; Mazzucato, E.; Meservey, E.; Motley, R.; Stevens, J.; von Goeler, S. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jun 1983. Contract AC02-76CH03073. 26p. NTIS, PC A03/MF A01. Order Number DE83014916.

Lower hybrid current-drive experiments have been carried out on the PLT Tokamak. Steady currents up to 175 kA have been maintained for three seconds and 400 kA for 0.3 sec by the rf power alone. The principal current carrier appears to be a high energy (~ 100 keV) electron tail, concentrated in the central 20 to 40 cm diameter core of the 80-cm PLT discharge. Effective current drive is observed only for anti n/sub e/ $\leq 8 \times 10^{12}$ cm^{-3}. This limitation may be a wave propagation phenomenon and not a fundamental plasma physics effects.

45149 (PPPL—2001) Topics in the theory of statistical closure approximations for plasma physics. Krommes, J.A. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Apr 1983. Contract AC02-76CH03073. 22p. (CONF-821246—1). NTIS, PC A02/MF A01. Order Number DE83012428.

From US/Japan workshop on statistical physics and chaos in fusion plasmas; Austin, TX, USA (13 Dec 1982).

Recent advances and directions in the theory of statistical descriptions for plasmas are discussed.

45150 (PPPL—2009) Echo phenomenon associated with lower-hybrid-wave launching. Wong, K.L.; Skiff, F.; Ono, M. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jun 1983. Contract AC02-76CH03073. 12p. NTIS, PC A02/MF A01. Order Number DE83014913.

Lower hybrid waves at two different frequencies f_1 and f_2 are launched simultaneously from two localized antennas, and a third wave is observed to arise near the plasma edge at the frequency $f = f_2 - f_1$. This phenomenon can be explained by an echo effect near the plasma surface.

45151 (PPPL—2013) Plasma rotation in the PDX tokamak. Brau, K.; Bitter, M.; Goldston, R.J.; Manos, D.; McGuire, K.; Suckewer, S. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jun 1983. Contract AC02-76CH03073. 46p. NTIS, PC A03/MF A01. Order Number DE83014915.

Toroidal and poloidal rotation has been measured in the Poloidal Divertor Experiment (PDX) tokamak in ohmic- and neutral-beam-heated plasmas in a variety of discharge conditions and in both circular and diverted configurations. Rotation velocities were deduced from Doppler shifts of magnetic dipole (M1) lines and lines of optically allowed transitions in the visible and uv regions, from K/sub α/ emission, and also from an array of magnetic pickup loops. Poloidal and toroidal rotation velocities in ohmically heated discharges were unusually less than 3×10^5 cm/sec. Near the plasma edge the toroidal-rotation velocity varies with poloidal angle both before and during neutral-beam injection. No systematic poloidal rotation was observed during neutral-beam injection centered about or displaced 10 cm from the horizontal midplane, which implies that the poloidal damping time tau/sub θ/ < 0.5 tau/sub ii/, consistent with theoretical estimates.

45152 (PPPL—2018) Lower-hybrid current drive with opposing ohmic drive on PLT. Stevens, J.; von Goeler, S.; Bernabei, S.; Chu, T.K.; Hooke, W.; Jobes, F.; Meservey, E.; Motley, R. (Princeton Univ., NJ (USA). Plasma Physics Lab.). Jun 1983. Contract AC02-76CH03073. 16p. NTIS, PC A02/MF A01. Order Number DE83014914.

Two distinct conditions where the rf phase velocity is directed opposite to the ohmically induced electron drift have been studied experimentally: (1) rf current ramp-up (f/sub p/ > 0),

where an induced electric field opposes the current increase; (2) rf current ramp-down, where waves are launched opposite the electron drift direction for a decaying plasma current. The time behavior of the electron tail is inferred from hard x-ray (30 to 750 keV) emission as a function of angle to B. In cases (1) and (2) we find that the emission amplitude in the reverse (opposite the LH phase velocity) direction increases throughout the rf pulse, while it is constant in the forward direction. This increase indicates that some high energy electrons are accelerated or are even running away in the direction opposite to the main rf produced tail. It also indicates for case (1) that the electric field in the plasma center has been reversed by the rf current drive.

45153 **(Rijnhuizen—82-143) Comparison of two approaches for solving equilibrium problems for axisymmetric current-carrying plasmas.** Goedbloed, J.P.; Zakharov, L.E. (Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica). Apr 1982. 15p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83703396.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted figs., 5 refs.

A comparison is made of two approaches for the solution of the Grad-Shafranov equation and for the analysis of the stability of local ballooning modes of the equilibria thus obtained. The first approach is based on an Eulerian grid that is globally adapted to the geometry of the magnetic surfaces by means of a conformal mapping. This approach is implemented in the numerical program HBT developed at the FOM Institute for Plasma Physics at Nieuwegein. The other approach is based on Lagrangian natural coordinates which are also locally adapted to the geometry of the magnetic surfaces. This approach exploits the method of moments which is implemented in the numerical program EMEQ developed at the Kurchatov Institute of Atomic Energy at Moscow. The results of the two codes are in excellent agreement.

45154 **(Rijnhuizen—82-144) Ideal MHD equilibrium of a weakly toroidal plasma column with elongated cross-section. Part 3: Non-elliptical cross-section and summary.** Bogert, A.J. van den; Heesch, E.J.M. van; Schuurman, W. (Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica). Sep 1982. 30p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83703397.

7 figs., 7 refs.

This report is the third and last part of a series dealing with analytic calculations of ideal MHD equilibria of a plasma column with elongated cross-section, surrounded by either a vacuum region or a tenuous plasma in a force-free field, both enclosed by a metal wall. Ideal MHD equilibrium of a straight plasma column with elliptic cross-section surrounded by a vacuum region (Gajewski's model) is extended to include the case of weakly non-elliptic cross-sections. Two methods of treating the perturbation of the plasma boundary analytically are described. They are illustrated by numerical examples and the limits of their applicability are indicated. Finally, some equilibria are constructed of a weakly toroidal plasma (treated in Part 1 of this report), surrounded by a force-free field region (analysed in Part 2), with the elliptical cross-section deformed in the direction of a racetrack.

45155 **(SFTI—1) Electron thermal conduction in a tokamak when Joule heating.** Stotland, M.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Sukhumi. Fiziko-Tekhnicheskij Inst.). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702878.

Relations for electron thermal conduction and energy lifetime of a plasma electron component in the ohmic heating regime in tokamak are considered. These relations are different from the Coppi-Mazucato scaling by the introduction of the < fsub(e) > factor-averaged oefficient of longitudinal conduction due to electron suppression. At normalized frequency of electron collisions νsub(e*) << 1 the < fsub(e) > value is only the geometric factor. The scaling suggested agree satisfactorily with experimental results obtained in a wide range of plasma parameter variation.

45156 **Analysis of the asymmetric part of electron—electron Boltzmann integral.** Kunc, J.A. (Space Sciences Center, SHS-274, University of Southern California, University Park, Los Angeles, California 90089-1341). *Journal of Applied Physics;* **54**: No. 7, 3788-3797(Jul 1983).

A numerical analysis of the asymmetric part of electron—electron collision integral is presented. The results are given in the form of graphs for two commonly considered plasma situations: the collision-dominated case (symmetric part of electron distribution is Maxwellian) and the field-dominated case (symmetric part of electron distribution is Druyvesteynian). The importance of the asymmetric part of e-e collision integral in the Boltzmann equation is also discussed.

45157 **Local WKB dispersion relation for the Vlasov—Maxwell equations.** Berk, H.L.; Dominguez, R.R. (Institute for Fusion Studies, The University of Texas at Austin, Austin, Texas 78712). *Physics of Fluids;* **26**: No. 7, 1825-1829(Jul 1983). Contract FG05-80ET53088;AT03-76ET51011.

A formalism for analyzing systems of integral equations, based on the Wentzel—Kramers—Brillouin (WKB) approximation, is applied to the Vlasov—Maxwell integral equations in an arbitrary-β, spatially inhomogenous plasma model. It is shown that when treating frequencies comparable with and larger than the cyclotron frequency, relevant new terms must be accounted for to treat waves that depend upon local spatial gradients. For a specific model, the response for very short wavelength and high frequency is shown to reduce to the straight-line orbit approximation when the WKB rules are correctly followed.

45158 **Kinetic and fluid ballooning stability in anisotropic ion tokamaks.** Cooper, W.A. (Fusion Energy Division, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physics of Fluids;* **26**: No. 7, 1830-1835(Jul 1983). Contract W-7405-ENG-26.

The derivation of a kinetic ballooning mode equation for multiple anisotropic fluid ion plasmas and Maxwellian adiabatic electrons is presented. Considering the magnetohydrodynamic (MHD) limit, a fluid ballooning mode equation similar to that derived from the Kruskal—Oberman energy principle is obtained, except that the energetic ions do not contribute to the instability driving mechanism because they drift across the destabilizing curvature region at a rate that is faster than the oscillation of the mode. A numerical example shows that the Kruskal—Oberman critical beta β/sub c/ $\simeq$2.65% can be increased to β/sub c/ $\simeq$4.1% when the ratio of peak energetic ion beta to peak total beta β/sub h/0/β_0 = 0.3. Finite Larmor radius (FLR) corrections are also evaluated.

45159 **Radial transport, end loss, and ambipolarity in tandem mirrors.** Myra, J.R.; Catto, P.J. (Plasma Research Institute, Science Applications, Inc., Boulder, Colorado 80302). *Physics of Fluids;* **26**: No. 7, 1836-1845(Jul 1983). Contract AC03-76ET53057.

A simple one-dimensional (radial) model describing end loss and radial transport in a tandem mirror is developed. The model enables a self-consistent calculation of various ambipolar potential profiles and the center-cell density profile in the presence of either conducting or insulating end walls. Results of the computation reproduce many features seen in the Tandem Mirror Experiment (TMX). Signatures of radial transport are delineated, and the effect on confinement is studied over a range of parameters. Optimal and critical values in parameter space are also investigated.

45160 **Quasilinear theory of suprathermal ions in mirror machines in the presence of radio-frequency fluctuations.** Hafizi, B.; Aamodt, R.E. (Science Applications, Inc., Plasma Research Institute, Boulder, Colorado 80302). *Physics of Fluids;* **26**: No. 7, 1846-1850(Jul 1983). Contract AC03-76ET53057.

A theory of fast-ion generation in the 2XIIB mirror experiment due to a single resonant electrostatic ion-cyclotron mode is presented. Assuming weak radial gradients of the magnetic induction, which appear to be consistent with experimental data, it is

shown that ions with small parallel excursions can be accelerated into the 40 keV region. Allowance for a periodic temporal variation of the amplitude of the mode results in stochastic motion of those ions whose range of parallel excursions form a limited but significant fraction of the plasma length. The diffusion coefficients of this class of ions are computed in the quasilinear approximation. The corresponding diffusion times are in reasonable accord with those from the experiment.

45161 **Particle simulations of ion-cyclotron turbulence in a mirror plasma.** Cohen, B.I.; Smith, G.R.; Maron, N.; Nevins, W.M. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physics of Fluids;* 26: No. 7, 1851-1865(Jul 1983). Contract W-7405-ENG-48.

Particle—fluid hybrid simulations of electrostatic ion-cyclotron instabilities in a mirror plasma have been extended to include axial ion bouncing in a nonuniform magnetic field. This model admits unstable ion-bounce modes as well as drift-cyclotron and drift-cyclotron-loss-cone modes. Linear theory showed that ion-bounce modes were as difficult to stabilize as drift-cyclotron-loss-cone modes, but the ion-bounce modes saturated at very low levels in simulations. Simulations have also followed the self-consistent interaction of a mirror plasma with turbulent electric fields in the presence of warm plasma stream, ion drag on electrons, injection of energetic neutral beams, and transit losses. Driven by velocity diffusion due to the drift-cyclotron-loss-cone instability, the plasma evolved to a stable configuration. The wave turbulence was moderated by streaming plasma and axial electron dissipation, was insensitive to the energy width of the neutral beam, and decayed when the neutral beam was removed. The simulation results confirmed many of the predictions of quasilinear theory and theories of orbital stochasticity, and were in qualitative agreement with many (but not all) of the observations in the Lawrence Livermore National Laboratory 2XIIB experiment.

45162 **Reduction of radial losses in bumpy tori.** Catto, P.J.; Hazeltine, R.D. (Science Applications, Inc., Plasma Research Institute, Boulder, Colorado 80302). *Physics of Fluids;* 26: No. 7, 1866-1870(Jul 1983). Contract AC03-76ET53057.

Toroidal corrections to the fields in a bumpy torus cause the particle drift surfaces to depart from the magnetic flux surfaces, thereby resulting in transport and direct radial losses. Such losses can be reduced by choosing field structures such that the drift and flux surfaces remain close everywhere. A technique is presented for finding, analytically, such optimized fields in the near-axis, vacuum approximation.

45163 **Nonlinear saturation of nonresonant internal instabilities in a straight spheromak.** Park, W.; Jardin, S.C. (Plasma Physics Laboratorty, Princeton University, Princeton, New Jersey 08544). *Physics of Fluids;* 26: No. 7, 1871-1873(Jul 1983). Contract AC02-76CH03073.

An initial value numerical solution of the time-dependent nonlinear ideal magnetohydrodynamic equations demonstrates that spheromak equilibria which are linearly unstable to nonresonant helical internal perturbations saturate at low amplitude without developing singularities. These instabilities thus represent the transition from an axisymmetric to a nonaxisymmetric equilibrium state, caused by a peaking of the current density.

45164 **Parametric instabilities near the critical density in steepened density profiles.** Estabrook, K.; Kruer, W.L. (University of California, Lawrence Livermore National Laboratory, Livermore, California 94550). *Physics of Fluids;* 26: No. 7, 1888-1891(Jul 1983). Contract W-7405-ENG-48.

Computer simulations of laser light absorption and hot-electron generation by the ion-acoustic decay and oscillating two-stream instabilities in nonlinearly steepened density profiles are presented. The steepened density scale length is estimated and used to estimate a condition for instability generation.

45165 **Theory and simulation of one-dimensional Raman backward and forward scattering.** Estabrook, K.; Kruer, W.L. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physics of Fluids;* 26: No. 7, 1892-1903(Jul 1983). Contract W-7405-ENG-48.

Computer simulations and theory are used to illustrate the linear and nonlinear behavior or Raman backward and forward scattering in laser-irradiated plasmas. The heated-electron distributions, nonlinear Landau damping, bandwidth of the scattered light, and other results of nonlinear simulations in homogeneous and nonhomogeneous plasmas are described. The characteristics of Raman scattering in a plasma with a quite high background temperature (64 keV) are examined, which are relevant to CO_2-heated plasmas. Finally the effects of self-generated magnetic fields are pointed out, which can reduce Raman scattering by inhibiting the transport of hot electrons, and the reduction of Raman scattering by use of laser light with a large bandwidth is described.

45166 **Harmonic generation of radiation in a steep density profile.** Grebogi, C.; Tripathi, V.K.; Chen, H. (Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, Maryland 20742). *Physics of Fluids;* 26: No. 7, 1904-1908(Jul 1983). Contract AS08-81DP40151.

It has been observed experimentally that the CO_2-laser Gemini and Helios systems generate very high harmonics with nearly constant efficiency over several harmonics with a cutoff near the local plasma frequency at the upper density shelf. To understand the experimental results, the strongly nonlinear electron response to a time-dependent inhomogeneous force is studied. The equation of the electron motion in Lagrangian variables is derived and the conditions on the density scale length and power intensities for wavebreaking are found. By transforming the solution back to Eulerian variables, it is shown that the source of a given high harmonic frequency is localized around the density region where the local plasma wave is at that frequency. Using the numerically obtained nonlinear current density we evaluate the intensity of the radiation coming out of the plasma and verify the nearly constant harmonic production efficiency with a sharp decrease at the local plasma wave frequency at the upper shelf density.

45167 **Eigenfunction analysis of the beam—plasma instability with finite radial dimensions.** Jones, M.E. (Applied Theoretical Physics Division, Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Physics of Fluids;* 26: No. 7, 1928-1935(Jul 1983).

A linear eigenfunction analysis of the beam—plasma instability for an annular beam interacting with a plasma filling the space between the conductors of a coaxial transmission line is presented. The beam and plasma electrons are modeled by relativistic cold fluids and the dispersion relation is three-dimensional and fully electromagnetic. Particular attention is given to the radial eigenfunction structure and extensive numerical examples are presented. The behavior of the dispersion relation with various parameters is interpreted in terms of the infinite homogeneous theory. Simple analytic approximations for the dispersion relation for annular beams are given. Also, particle-in-cell simulation results are compared with the predictions of the linear analysis.

45168 **Investigations of the magnetic structure and the decay of a plasma-gun-generated compact torus.** Turner, W.C.; Goldenbaum, G.C.; Granneman, E.H.A.; Hammer, J.H.; Hartman, C.W.; Prono, D.S.; Taska, J. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physics of Fluids;* 26: No. 7, 1965-1986(Jul 1983). Contract W-7405-ENG-48.

The results of a series of experimental measurements of compact toroidal (CT) plasmas produced by a magnetized coaxial plasma gun injecting into a flux-conserving metallic liner are reported. The experiments were performed on the Beta II facility at Lawrence Livermore National Laboratory. The magnetic equilibria are well described by a force-free eigenmode structure that results from an extension of Taylor's theory of the reversed-field pinch. Consideration of helicity conservation during relaxation of the composite plasma-gun flux-conserver system to the final state equilibri-

um yields theoretical expressions that are compared with the experiment.

45169 **Energy confinement studies in the tandem mirror experiment (TMX): Power flow.** Grubb, D.P.; Allen, S.L.; Casper, T.A. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physics of Fluids;* **26**: No. 7, 1987-2002(Jul 1983). Contract W-7405-ENG-48.

Using the measured plasma densities and energies, the flow of power between the different particle species and regions of the tandem mirror experiment (TMX) is analyzed. The power flow is described by a simple classical model modified to include: (1) a halo of cool plasma that reduces end-cell ion losses due to charge exchange on background gas, (2) instability heating of the central-cell ions both in the central cell and as they escape through the plugs, (3) electron energy transport along the field lines which is less than predicted, and (4) radial transport of the central-cell ions. Our global power balance, including all particles and regions, accounts for 87 +- 27% of the trapped neutral-beam power.

45170 **Energy confinement studies in the tandem mirror experiment (TMX): Power balance.** Grubb, D.P.; Allen, S.L.; Casper, T.A. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physics of Fluids;* **26**: No. 7, 2003-2010(Jul 1983). Contract W-7405-ENG-48.

The power balance in the Tandem Mirror Experiment (TMX) is studied for several days of operation. Between them, these days typified the operating range of TMX. Examining the power balance on axis, it is found that 60% to 100% of the power is carried to the end walls by escaping central-cell ions. Globally, these calculations account for 70% to 100% of the input power on each of the days studied. Based upon the power balance, the energy confinement times of the particle species are calculated. The end-cell ion energy confinement time is similar to that achieved in the 2XIIB single-cell magnetic mirror experiment, whereas the electron energy confinement in TMX was 10 to 100 times better. The central-cell ion energy confinement in the central flux tube was determined by axial particle loss. At the central-cell plasma-edge radial particle transport and charge exchange with the fueling gas are important processes.

45171 **Role of photodetachment in initiation of electric discharges in SF_6 and O_2.** Van Brunt, R.J.; Misakian, M. (National Bureau of Standards, Washington, DC 20234). *Journal of Applied Physics;* **54**: No. 6, 3074-3079(Jun 1983).

The role of photodetachment in the initiation of electron avalanches near a positive point electrode was investigated for a discharge gap in which the negative ion flux was controlled by UV irradiation of the cathode. For irradiation of the anode region with light beams up to 500 mW, photodetachment was found to make a negligible contribution to avalanche initiation in SF_6 and O_2 at pressures from 50 to 500 kPA (~0.5 to 5 atm). The conditions under which the role of photodetachment might be observed are discussed, and it is shown that for the conditions considered here the expected dominant electron release mechanism in the gap is through collisional detachment of stable negative ions. Previously reported enhancements in avalanche rates resulting from irradiation of a positive point can be explained as arising from increases in negative ion densities due to attachment of photoelectrons ejected by scattered radiation.

45172 **Nonintrinsic ambipolar diffusion in turbulence theory.** Berk, H.L.; Molvig, K. (Institute for Fusion Studies, The University of Texas at Austin, Austin, Texas 78712). *Physics of Fluids;* **26**: No. 6, 1385-1388(Jun 1983). Contract FG05-80ET53088;AC02-78ET51013.

Ambipolar flow in a turbulent plasma is investigated by combining a WKB treatment of the waves with a turbulent collision operator resulting from either quasilinear theory or certain renormalized turbulence theories. If the wave momentum has a flow from outgoing waves, then particle diffusion is not intrinsically ambipolar, and the time variation of the electric potential profile is determined by the turbulent spectrum. However, in most cases of practical interest, as in the drift-wave problem, this effect is small; and in steady state, equal rates of stochastic diffusion are predicted for electrons and ions.

45173 **Monte Carlo calculation of resonant diffusion coefficients in the ELMO Bumpy Torus and the applicability of local diffusion theory.** Tolliver, J.S.; Jaeger, E.F.; Hastings, D.E.; Hedrick, C.L. (Computer Sciences at Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physics of Fluids;* **26**: No. 6, 1391-1394(Jun 1983). Contract W-7405-ENG-26.

A Monte Carlo calculation of resonant diffusion coefficients in the ELMO bumpy torus (EBT) is described and is shown to agree well with analytic theory in a regime where the assumptions of local, diffusive behavior are valid. Since present and future EBT devices do not fall into this regime, local diffusion theory may not be entirely applicable.

45174 **Electromagnetic drift modes driven by pressure gradients in tokamaks.** Horton, W.; Choi, D.; Hong, B. (Institute for Fusion Studies and Department of Physics, The University of Texas at Austin, Austin, Texas 78712). *Physics of Fluids;* **26**: No. 6, 1461-1466(Jun 1983). Contract FG05-80ET53088.

A hybrid of hydrodynamics and kinetics is used to study the effect of finite plasma pressure on the pressure-gradient driven toroidal drift modes. The linear drift modes of the system are given by a fifth-order polynomial describing the coupling of the electron-drift, the ion-acoustic, and the shear Alfven oscillations. The characteristic frequencies, growth rates, and polarization of the electromagnetic modes are investigated as functions of the parameters of toroidicity, plasma gradients, and plasma pressure.

45175 **Fokker-Planck equation for a plasma in a magnetic field with electrostatic fluctuations.** Matsuda, K. (General Atomic Company, San Diego, California 92138). *Physics of Fluids;* **26**: No. 6, 1508-1515(Jun 1983). Contract AT03-76ET51011.

An alternative procedure for the approach used by Ichimaru and Rosenbluth on transport problems of a plasma in a uniform magnetic field including the effects of fluctuating electric fields is proposed. The resultant kinetic equation reduces to the Rostoker equation in the case of a quiescent plasma and reduces to the quasi-linear diffusion equation if the effects of the self-field of particles are ignored. The transverse particle diffusion coefficient obtained by our approach reduces to well-known classical results as special cases.

45176 **Resonant ion transport in the ELMO Bumpy Torus.** Hastings, D.E.; Jaeger, E.F.; Hedrick, C.L.; Tolliver, J.S. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physics of Fluids;* **26**: No. 6, 1516-1525(Jun 1983). Contract W-7405-ENG-26.

Modeling the ELMO Bumpy Torus as a bumpy cylinder with toroidally induced vertical drift, neoclassical transport coefficients are obtained for resonant ions as integrals over the energy-dependent flux. A continuous approximation to this energy-dependent flux reduces to the correct results in the banana and plateau regimes and yields simple analytic formulas for the diffusion coefficients which agree well with numerical results.

45177 **Calculation of parallel viscosity in the plateau regime.** Shaing, K.C.; Callen, J.D. (Nuclear Engineering Department, University of Wisconsin-Madison, Madison, Wisconsin 53706). *Physics of Fluids;* **26**: No. 6, 1526-1527(Jun 1983). Contract AC02-80ER53104.

A direct calculation of the parallel viscosity <Bxdelxπ/sub a/> in the plateau regime for a large-aspect-ratio, axisymmetric tokamak is presented.

45178 **Emission, absorption, and tunneling of whistler waves in an inhomogeneous magnetic field.** Ellis, R.F.; Tsakiris, G.D.; Boyd, D.A. (Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, Maryland 20742). *Physics of Fluids;* **26**: No. 6, 1528-1541(Jun 1983).

Measurements of electron cyclotron emission parallel to a magnetic field in the regime where finite density effects are important and measurements of electron cyclotron wave tunneling parallel to a magnetic field are reported. The experiments were conducted in a low-temperature (T/sub e/ ~2 eV) moderate-density (n/sub e/ = 3 x 10^9—3 x 10^{12} cm^{-3}) gas discharge plasma in a magnetic mirror geometry. Experimental results are compared with two models, both of which employ Kirchoff's law to relate emission and absorption. In one model, absorption from hot-plasma theory is calculated and in the other a cold-plasma Budden tunneling type analysis is employed. Both models are in reasonable agreement, with the data generally bracketing the experimental results, and the experiment could not resolve which model is superior. The utility of whistler mode cyclotron emission as an electron temperature diagnostic measurement on mirror machines is confirmed.

45179 **Radio-frequency wave enhanced runaway production rate.** Chan, V.S.; McClain, F.W. (General Atomic Company, San Diego, California 92138). *Physics of Fluids;* **26**: No. 6, 1542-1544(Jun 1983). Contract AT03-76ET51011.

Enhancement of runaway electron production (over that of an Ohmic discharge) can be achieved by the addition of radio-frequency waves. This effect is studied analytically and numerically using a two-dimensional Fokker—Planck quasilinear equation.

45180 **Nonresonant electron transport in the ELMO Bumpy Torus experiment using a BGK operator.** Hastings, D.E.; Spong, D.A. (Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830). *Physics of Fluids;* **26**: No. 6, 1551-1558(Jun 1983). Contract W-7405-ENG-26.

For the experimentally measured parameters in the ELMO Bumpy Torus (EBT) experiment, the electrons in the core plasma are nonresonant; that is, the average delB x B and E x B precessional drifts are in the same direction. Analytic transport rates exist for the electrons in the case where the ambipolar field is large relative to the plasma thermal energy. For finite fields, the diffusion coefficients have been calculated numerically. An analytic expansion away from the large field case that provides corrections to the results of Kovrizhnykh for finite fields has been developed from a BGK operator. These expressions are compared with the numerical calculations for parameters of experimental interest and it is shown that a substantially improved approximation over the Kovrizhnykh results can be obtained.

45181 **Numerical magnetohydrodynamic studies of magnetic mirrors.** Strauss, H.R.; Wollman, S.; Wakatani, M. (Courant Institute of Mathematical Sciences, New York University, New York, New York 10012). *Physics of Fluids;* **26**: No. 6, 1559-1563(Jun 1983). Contract AC02-76ER03077.

Nonlinear, three-dimensional, finite-beta, tensor-pressure, magnetohydrodynamic equilibria are computed for the 2XIIB and TMX-U devices, which are a minimum-B and a tandem mirror, and stability to long-wavelength interchange modes is determined. Finite beta is found to have a relatively weak destabilizing effect. The m = 4 distortions of TMX-U flux surfaces are small and tend to produce slightly diamond-shaped cross sections.

45182 **Adiabatic compression of elongated field-reversed configurations.** Spencer, R.L.; Tuszewski, M.; Linford, R.K. (Los Alamos National Laboratory, University of California, Los Alamos, New Mexico 87545). *Physics of Fluids;* **26**: No. 6, 1564-1568(Jun 1983).

The adiabatic compression of an elongated field-reversed configuration (FRC) is computed by using a one-dimensional approximation. The one-dimensional results are checked against a two-dimensional equilibrium code. For ratios of FRC separatrix length to separatrix radius greater than about ten, the one-dimensional results are accurate within 10%. To this accuracy, the adiabatic compression of FRC's can be described by simple analytic formulas.

45183 **Electron temperature differences and double layers.** Chan, C.; Hershkowitz, N.; Lonngren, K.E. (Department of Nuclear Engineering, University of Wisconsin, Madison, Wisconsin 53706). *Physics of Fluids;* **26**: No. 6, 1587-1595(Jun 1983). Contract AC02-76ET53034.

Electron temperature differences across plasma double layers are studied experimentally. It is shown that the temperature differences across a double layer can be varied and are not a result of thermalization of the bump-on-tail distribution. The implications of these results for electron thermal energy transport in laser-pellet and tandem-mirror experiments are also discussed.

45184 **Experimental studies of spheromak formation.** Bruhns, H.; Chin-Fatt, C.; Chong, Y.P.; DeSilva, A.W.; Goldenbaum, G.C.; Griem, H.R.; Hart, G.W.; Hess, R.A.; Irby, J.H.; Shaw, R.S. (Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, Maryland 20742). *Physics of Fluids;* **26**: No. 6, 1616-1625(Jun 1983).

Studies in the PS-1 spheromak configuration can be effectively formed by a combined z- and θ-pinch technique on both a fast (tau/sub formation/atau/sub Alfve/n) and a much slower timescale. The gross tilt and shift instability of the toroid can be suppressed by a combination of conduction walls, shaping the separatrix by externally applied fields, and the use of "figure-eight" coils. Optimum stabilty is obtained for almost spherical toroids. Maximum field-reversal times for stable, well-confined toroids are > or =40 /μsec, consistent with resistive decay. Temperatures during the stable decay are 5—10 eV; impurity radiation is an important energy-loss mechanism.

45185 **Suppression of the n = 2 rotational instability in field-reversed configurations.** Hoffman, A.L.; Slough, J.; Harding, D.G. (Mathematical Sciences Northwest Inc., Bellevue, Washington 98004). *Physics of Fluids;* **26**: No. 6, 1626-1629(Jun 1983). Contract AC06-80ER53096.

Compact toroid plasmas formed in field-reversed theta pinches are generally destroyed after 30—50 μsec by a rotating n = 2 instability. In the reported experiment, instability is controlled, and the plasma destruction is avoided in the TRX-1 theta pinch through the application of octopole magnetic fields. The decay times for loss of poloidal flux and particles are unaffected by the octopole fields. These decay times are about 100 μsec based on inferences from interferometry and excluded flux measurements. The weak, rotating elliptical disturbance (controlled n = 2 mode) also made possible a novel determination of the density profile near the separatrix using single-chord interferometry. The local density gradient scale length in this region is found to be about one ion gyrodiameter.

45186 **Infrared calorimeter for time-resolved plasma energy flux measurement.** Ingraham, J.C.; Miller, G. (Los Alamos National Laboratory, Los Alamos, New Mexico 87545). *Review of Scientific Instruments;* **54**: No. 6, 673-676(Jun 1983). Contract W-7405-ENG-36.

An infrared calorimeter system for measuring energy flux in a noisy electromagnetic environment has been developed. A thin (13 μ) oxidized stainless-steel foil is heated by energy flux and its temperature is determined by measuring the infrared emission from the back surface of the foil. The radiation is transported to the detector, which is located inside a double-shielded enclosure, through a nylon-tube infrared telescope. The calculated response time is 12 μs, and the measured peak-to-peak noise is equivalent to 0.4 mJ/cm^2 deposited energy.

45187 **Operation of the tandem-mirror plasma experiment with skew neutral-beam injection.** Simonen, T.C.; Allen, S.L.; Casper, T.A. (Lawrence Livermore National Laboratory, University of California, Livermore, California 94550). *Physical Review Letters;* **50**: No. 21, 1668-1671(23 May 1983). Contract W-7405-ENG-48.

Tandem-mirror plasma with sloshing-ion end plugs has been produced. Ion-velocity distribution functions are peaked at 47° to the magnetic field lines. Low-level ion-cyclotron fluctuations were detected at 1.8 times the plug-midplane frequency and with properties predicted by theory; they did not degrade plasma confinement in the plugs or central cell.

45188 **Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases.** Armstrong, R.A.; Lucht, R.A.; Rawlins, W.T. (U.S. Air Force Geophysics Laboratory, Optical Physics Division, Hanscom Air Force Base, Massachusetts 01731). *Applied Optics;* **22**: No. 10, 1573-1577(15 May 1983).

Laser-initiated breakdown of N_2, O_2, and Ar has been investigated at sub-atmospheric pressures using a pulsed (10-nsec) Nd:yttrium aluminum garnet (Nd:YAG) laser at 1.07 μm. Breakdown thresholds have been determined from 3 to 760 Torr, and spectral analysis of the plasma emission has been carried out at 10 and 125 Torr over the 300—600-nm range. Sharp spectral features arising from highly excited singly and multiply charged ions are reported as well as an underlying continuum at intermediate pressure. Time-resolved measurements indicate a complex kinetic dynamic optical behavior.

45189 **Particle simulation of plasmas.** Dawson, J.M. (Department of Physics, University of California, Los Angeles, California 90024). *Reviews of Modern Physics;* **55**: No. 2, 403-448(Apr 1983).

For plasma with a large number of degrees of freedom, particle simulation using high-speed computers can offer insights and information that supplement those gained by traditional experimental and theoretical approaches. The technique follows the motion of a large assembly of charged particles in their self-consistent electric and magnetic fields. With proper diagnostics, these numerical experiments reveal such details as distribution functions, linear and nonlinear behavior, stochastic and transport phenomena, and approach to steady state. Such information can both guide and verify theoretical modeling of the physical processes underlying complex phenomena. It can also be used in the interpretation of experiments.

45190 **Comment on tandem-mirror transport.** Cohen, R.H. (Law- p rence Livermore National Laboratory, Livermore, California 94550). *Physical Review Letters;* **50**: No. 13, 1019(28 Mar 1983). Contract W-7405-ENG-48.

Resonant-plateau diffusion in TMX devices is conected.(AIP)

45191 **Catto and Myra respond:.** Catto, P.J.; Myra, J.R. (Science Applications, Incorporated, Plasma Research Institute, Boulder, Colorado 80302). *Physical Review Letters;* **50**: No. 13, 1020(28 Mar 1983).

A reply to the comment on transport in Tandem-mirrors is given.

45192 **Negative-resistance characteristics of a Langmuir probe in a turbulent plasma.** Jones, R. (Plasma Physics Research Lab., Colonia, NJ (USA)). *Lettere al Nuovo Cimento;* **36**: No. 9, 249-254(26 Feb 1983).

Negative-resistance characteristics have previously been observed for Langmuir probes in magnetized plasmas and theoretical explanations have, unanimously, depended upon magnetic effects. In our present experiment we observe negative resistance in an unmagnetized plasma and strongly correlated with the presence, and strength, of ambient ion wave turbulence.

45193 **A variance reduction technique for coulomb-nuclear thermalization of energetic fussion products in hot plasmas.** DeVeaux, J.C.; Miley, G.H. (University of Illinois, Urbana, IL 61801). *Transactions of the American Nuclear Society;* **43**: 393-394(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45194 **Overview of the use of Monte Carlo methods in controlled thermonuclear fusion research.** Post, D.E. (Princeton University, Plasma Physics Laboratory, P.O. Box 451, Princeton, NJ 08544). *Transactions of the American Nuclear Society;* **43**: 395(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45195 **Monte Carlo methods for optimizing torsatron configurations.** Rome, J.A.; Fowler, R.H.; Hirshman, S.P.; Lyon, J.F. (Oak Ridge National Laboratory, Oak Ridge, TN 37830). *Transactions of the American Nuclear Society;* **43**: 396-397(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45196 **Monte Carlo calculation of neutral transport in Tokamaks.** Heifetz, D.; Post, D. (Princeton University, Plasma Physics Laboratory, P.O. Box 451, Princeton, NJ 08544). *Transactions of the American Nuclear Society;* **43**: 397-398(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45197 **Ridge waveguide aperture antenna.** Tanabe, H.; Goto, N. Gif-sur-Yvette, France; CEA Centre d'Etudes Nucleaires de Saclay (1982). 15p. (In French). CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France).

Translation of report A-P80-22 (Institute of Technology, Tokyo Japan) p. 49-54.

The characteristics of an open end ridge waveguide were studied with a view of using it as on antenna for ionic cyclotron heating of plasma. Considerable amount of reflection occurs with this type of waveguide. It is demonstrated that modification to the cross section and shape of the end of this wave guide can reduce reflections.

7002 Fusion Power Plant Technology

REFER ALSO TO CITATION(S) 44139, 44150, 44151, 44152, 44153, 44154, 44158, 44162, 44277, 44400, 44401, 44474, 44526, 44528, 44529, 44530, 44531, 44532, 45042, 45193, 45194

45198 **(CONF-820545—23) Effect of oxygen monolayer coverages on titanium sputtering yields as determined by simultaneous laser fluorescence and auger measurements.** Pellin, M.J.; Young, C.E.; Mendelsohn, M.H.; Gruen, D.M.; Wright, R.B.; DeWald, A.B. (Argonne National Lab., IL (USA)). 1982. Contract W-31-109-ENG-38. 21p. NTIS, PC A02/MF A01. Order Number DE83014716.

From 5. International conference on plasma surface; Gatlinburg, TN, USA (3 May 1982).

Portions are illegible in microfiche products.

The presence of an oxide layer can strongly influence the charge-state of species ejected from ion-bombarded metal surfaces, as well as the total sputtering yield. These quantities directly affect the influx of metallic impurities from the wall region into the plasmas of fusion devices. Surface coverage can also modify the distribution of sputtered atoms among electronic states and thus the apparent impurity density detected by the laser fluorescence spectroscopy (LFS) technique. The measurements reported here provide LFS data on number density and electronic state populations for the species Ti and Ti^+ as a function of surface oxygen coverage in a laboratory apparatus providing for direct monitoring by Auger analysis.

45199 **(CONF-830406—63) Design of the Advanced Toroidal Facility (ATF-1).** Johnson, R.L.; Adams, O.B.; Jernigan, T.C.; Nelson, B.E.; Lyon, J.F.; Thompson, P.B. (Oak Ridge National Lab., TN (USA)). 1983. Contract W-7405-ENG-26. 17p. NTIS, PC A02/MF A01. Order Number DE83012641.

From 5. topical meeting on technology of fusion energy; Knoxville, TN, USA (26 Apr 1983).

The Advanced Toroidal Facility-1 (ATF-1) is a torsatron being designed at ORNL as a replacement for the ISX-B tokamak. The concept for the device includes two continuous helical field coils which are segmented by way of demountable joints, two pair of vertical field coils and a set of twelve toroidal field coils. The vacuum vessel is placed inside the helical field coils and an external toroidal shell support structure is provided to react all coil and

vacuum vessel loads. The present design status for all systems is discussed.

45200 **(CONF-830654—) Gyrotron user/developer meeting.** (Department of Energy, Washington, DC (USA)). Jul 1983. 250p. NTIS MF A01. Order Number DE83015422.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted.

A title listing is included for each of the 13 included papers. (MOW)

45201 (CONF-830654—, pp 1-17) **ORNL 28-GHz user experience.** White, T.L. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45202 (CONF-830654—, pp 18-25) **TMX upgrade ECRH schematic.** Porter, G. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45203 (CONF-830654—, pp 26-37) **60 GHz ECH on Doublet III: 40 kW phase.** Moeller, C. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45204 (CONF-830654—, pp 69-72) **Fusion gyrotron development status.** Loring, M. (Oak Ridge National Lab., TN). Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45205 (CONF-830654—, pp 73-100) **60 GHz, 200 kW, CW gyrotron development.** Tancredi, J. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45206 (CONF-830654—, pp 101-111) **Tag gun conceptualization.** Dionne, N. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45207 (CONF-830654—, pp 112-126) **MIT gyrotron program.** Temkin, R. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45208 (CONF-830654—, pp 127-149) **Varian gyrotron programs.** Craig, J. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45209 (CONF-830654—, pp 150-184) **Varian gyrotrons in plasma experiments.** Jory, H. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45210 (CONF-830654—, pp 185-207) **NRL megawatt gyrotron program. Status review.** Zead, M.E. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45211 (CONF-830654—, pp 208-237) **Free electron maser for fusion applications.** Arnush, D.; Boehmer, H.; Caponi, M.Z. Jul 1983. NTIS MF A01.

From Gyrotron users/developers meeting; Germantown, MD, USA (15 Jun 1983).

45212 **(DOE/DP/40124—6) LLE Review. Quarterly report, July 1982-September 1982.** Forsyth, J.M. (ed.). (Rochester Univ., NY (USA). Coll. of Engineering and Applied Science). 1982. Contract AC08-80DP40124. 53p. NTIS, PC A04/MF A01. Order Number DE83014837.

This edition of the LLE Review contains articles which summarize progress in various uniformity experiments on OMEGA, progress in aspects of target fabrication directly related to uniformity and transport studies, and a summary of recent user experiments performed on GDL. Some highlights of the work described in this issue are: (1) achievement of 5% RMS uniformity of irradiation in long-pulse OMEGA target experiments; (2) direct measurement of final core rho R of 2.5 x 10^3 g/cm^2 in Ar-DT targets; (3) improvement of OMEGA beam profile uniformity resulting from a systematic study of stress-induced briefringence in LHG-8 laser rods; (4) successful deployment of ultra low-mass stalks for support of glass microballoon targets in OMEGA experiments; (5) the use of biased magnetron sputtering to improve the uniformity of metal coatings applied to glass microballoons; and (6) the study of the interaction of high-intensity, 0.351-μm radiation with long-scalelength, completely underdense plasmas by measurement of light produced by stimulated Raman scattering.

45213 **(DOE/DP/40133—1) Crystal-diffraction system for spectroscopy, imaging, and interferometry of inertially confined fusion targets. Final report for the period ending January 1, 1983.** Burek, A.J.; Yaakobi, B. (Rochester Univ., NY (USA). Lab. for Laser Energetics). Mar 1983. Contract AI08-81DP40133. 188p. NTIS, PC A09/MF A01. Order Number DE83015439.

An alternative to germanium and silicon for high efficiency in transmission is PET 020 which can be easily cleaved in large pieces to 100 μm thickness and has high integrated reflectivity in transmission, for wavelengths greater than 2A. A Laue spectrograph using PET 020 was successfully used to record Ti^{+20} x-ray lines emitted by a laser produced plasma. Single crystal imaging with a focusing Laue spectrograph is achromatic. Very thin crystals are needed both for high spatial resolution and for adequate efficiency. A spatial resolution of 10 μm was demonstrated using 3.75 μm thick planar etched germanium. A spatial resolution of about 10 μm seems to be the practical limit for single crystal Laue imaging. This limit is imposed by rocking curve spread for the thin crystals that must be used to reduce Borrmann fan expansion.

45214 **(DOE/DP/40152—T1) Image-enhancement tools for tracing fringe patterns in holographic interferograms acquired during laser-fusion experiments. KMSF-U-1346.** Vavra, P.C.; Busch, G.E.; Shepard, C.L. (KMS Fusion, Inc., Ann Arbor, MI (USA)). 1983. Contract AC08-82DP40152. 10p. (CONF-830874—6). NTIS, PC A02/MF A01. Order Number DE83014833.

From 27. annual international technical symposium on high speed photography, videography and photonics; San Diego, CA, USA (21 Aug 1983).

Portions are illegible in microfiche products.

A multi-frame probing system developed for use in laser fusion experiments quadruples the number of holographic interferograms acquired during each laser shot. In order to handle the increase in quantity of data, improvements over the previous method of locating fringes using a tablet digitizer were required. Conventional turnkey image enhancement and fringe tracing methods were found to be inadequate due to the noise levels and fringe densities present. A set of interactive adaptive digital image processing tools was developed to help scientists trace fringe patterns in the holographic interferograms. Preliminary results are promising.

45215 **(EGG-M—11183) Experimental investigation of muon-catalyzed fusion in high-density deuterium-tritium mixtures.** Jones, S.E.; Caffrey, A.J.; Walter, J.B.; Anderson, A.N.; Watts, K.D.; Anderson, J.L.; Bradbury, J.N.; Gram, P.A.M.; Leon, M.; Paciotti, M.A. (EG and G Idaho, Inc., Idaho Falls (USA); Los Alamos National Lab., NM (USA)). 1983. Contract AC07-76ID01570. 21p. (CONF-830632—6). NTIS, PC A02/MF A01. Order Number DE83014954.

From 3. international conference on emerging nuclear energy systems; Helsinki, Finland (6 Jun 1983).

Data are presented from the first experimental determination of the absolute neutron yield of the muon-catalyzed fusion reaction: $\mu^- + d + t \rightarrow \mu^- + {}^4He + n + 17.6$ MeV. At high deuterium-tritium density (up to 60% of liquid hydrogen density), copious 14-MeV neutron production is observed, demonstrating many d-t fusions per muon. The μdt-molecule formation rates are demonstrated to be large and strongly dependent on temperature in the range 100 to 540K. The probability of muon retention by the synthesized helium ion is also measured, along with other quantities affecting the efficiency of muon catalysis.

45216 (GSI—82-8, pp 63-75) **HIBALL - a conceptual design study of a heavy-ion driven inertial confinement fusion power plant.** Kessler, G.; von Moellendorf, U.; Moses, G.A. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

A preliminary concept for a heavy-ion beam driven inertial confinement fusion power plant is presented. The RF accelerator driver with its inherent high repetition rate is utilized to serve four reactor chambers alternatingly. In the chambers a novel first-wall protection scheme is used. At a target gain of 83 the total net electrical output is 3.8 GW. The recirculating power fraction is below 15%. The main goal of the comprehensive HIBALL study (which is continuing) is to demonstrate the compatibility of the design of the driver, the target and the reactor chambers. Though preliminary, the present design is essentially self-consistent. Tentative cost estimates are given. The costs compare well with those found in similar studies on magnetic confinement fusion reactors.

45217 (GSI—82-8, pp 76-86) **Heavy ion ICF study from the view of energy costs.** Miyahara, A.; Kawasaki, S.; Nakajima, K.; Kobayashi, N.; Yamamoto, K. 1982. NTIS (US Sales Only), PC A99/MF A01. (CONF-820338—).

From Symposium on accelerator aspects of ion fusion; Darmstadt, F.R. Germany (29 Mar 1982).

Energy analysis studied for specified HIF scenarios in our previous paper is refined to give a more reliable measure for the choice of the various driver accelerator components and their combination, including the particle species, energy state, final energy and the sizes of the driver and the reactor. A simple selection policy adopted in accord with our environmental situation leads to a driver assembly having multiple induction linacs as the main part, every component part of which is evaluated in the energy term. The resulted energy cost of the driver is comparable with or higher than that of the reactor-generator system as expectedly and shows that in the energy term HIF program has a narrow possibility as the way for realizing a practical power generating station in the state as Japan, where serious are environmental impacts such as land and water use, radioactive release, accidents and handling of radioactive fuel and wastes. A breakthrough in development of the accelerator technology would be highly desirable, in order to reduce the scale required for the driver.

45218 **(GTFR—37) Ripple-reduction poloidal-field coils for tokamak reactors.** Bateman, G. (Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics). Feb 1983. Contract AS05-78ET52025. 26p. NTIS, PC A03/MF A01. Order Number DE83009532.

A conceptual design is presented using a combination of superconducting Ripple Reduction Poloidal Field (RRPF) coils together with normal saddle coils in an INTOR-sized tokamak reactor consisting of 8 toroidal field (TF) coils with 7.0 m by 9.4 m active coil bore. The RRPF coils consist of dipole magnetic coils placed between the TF coils and the neutron shielding to produce part of the shaping field needed for a D-shaped plasma equilibrium and to reduce magnetic ripple near the top and bottom of the plasma. They are designed to share the TF coil cryostat and support structure, without obstructing access to the shielding, blanket or first wall. The normal (e.g. water cooled copper) saddle coils are imbedded in the shielding one meter away from the first wall. They carry less than 0.6 MA turns of current and consume less than 16 MW power to reduce magnetic ripple primarily near the midplane of the plasma.

45219 **(GTFR—40) Tokamak ETR objectives, characteristics, and critical issues.** Stacey, W.M. Jr. (Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics). 29 Mar 1983. Contract AS05-78ET52025. 12p. NTIS, PC A02/MF A01. Order Number DE83009549.

Portions are illegible in microfiche products.

An initial identification of objectives and physical characteristics of a tokamak engineering test reactor is made, based upon the large body of work that has been devoted to the study of such devices over the past decade. The critical technical issues affecting the feasibility and the specification of design concept for a tokamak engineering test reactor are discussed.

45220 **(IA—1374) Laser fusion (for pedestrians).** Eliezer, S. (Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center). Feb 1982. 45p. (CONF-820282—1). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83902608.

From Israel Optical Society winter school on high power lasers and applications; Tel-Aviv, Israel (1 Feb 1982).

The physics of laser fusion is described on an elementary level. The irradiated matter consists of a dense inner core surrounded by a less dense plasma corona. The interaction physics between laser and matter leading to thermonuclear burn is summarized by the following sequence of events: laser absorption → Energy transport → Compression → Nuclear Fusion. This scenario is shown in particular for a Nd:laser with a wavelength of 1 μm. The wavelength scaling of the physical processes is also discussed. In addition to the laser-plasma physics, the Nd high power pulsed laser is described. We give a very brief description of the oscillator, the amplifiers, the spatial filters, the isolators and the diagnostics involved. The concept of reactors for laser fusion and the necessary laser system are discussed.

45221 **(IAE—3498/14) Energy losses when three-step current switching from an inductive storage into a coil with a liner.** Ivanov, I.A.; Lototskij, A.P. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 19p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702862.

Energy losses when current three-step switching from inductive storage into a coil with a liner are evaluated. It is shown that for systems with current multiplication or coil connection via transformer energy losses in isolators and releases (one- and two-step commutators) ammount to not more than half peaker plosion energy if its substance is totally evaporated.

45222 **(IAE—3500/14) Electromagnetic processes in a resonance invertor of a feedback system.** Naftulin, S.M. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 12p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702863.

At the Tokamak-12 device an automatic system of plasma filament equilibrium confinement is developed. The system is employed for stabilizing instability relative to plasma filament vertically. For obtaining controlling magnetic field a thyristor power amplifier is applied. Electromagnetic processes investigation in automatic system is carried out. The power amplifier consists of a resonance invertor, current polarity reversering switch and power source. The resonance invertor is constructed with the series LCsub(k) circuit and the current in the power circuit of the automatic system is changed according to the oscillation law. The main purpose of the resonance invertor-realization of the control process function with time-pulse modulation. The invertor operates from control pulses continuously at positive as well as negative voltage of the plasma filament shifting signal.

45223 **(IAE—3513/7) Toroidal magnet for a tokamak with a strong magnetic field and combined adiabatic compression of the plasma filament.** Alekseev, Yu.A.; Demichev, V.F.; Safonova, M.B.; Chuyanov, V.A. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 44p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702864.

Concept and main characteristics of a tokamak toroidal magnet with a strong field and combined adiabatic compression of the plasma filament attaining the Q=1 parameter have been considered for experiment (Q is the ratio of fusion reaction power to the power of plasma losses). Magnetic system with inductor windings located under and over toroidal magnet is numerically investigated. Each magnet unit has a massive single-layer conductive turn enclosed in strengthening nonmagnetic steel yoke that takes up the force and provides the mechanical streangth of the system. Magnet temperature condition, problems of experiment optimization on compact takamak, extraction of energy from the magnet and the variant of a magnet cooled to nitrogen temperature are considered. Calculations presented show that toroidal magnet for a tokamak with a strong magnetic field and combined adiabatic compression of the plasma filament Q=1 is technically feacible.

45224 **(IAE—3515/7) First experiments on the TO-2 tokamak with a divertor.** Artemenkov, L.I.; Grodzinskij, E.V.; Gurov, A.A.; Melikhov, P.I.; Mukhin, P.A.; Papkov, L.N.; Popryadukhin, A.P.; Shvidt, N.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). 1981. 23p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702865.

Long stable discharges have been obtained in a recetrack tokamak with toroidal divertors in low plasma density regime. Divertors sharply limit plasma filament cross section, plasma density decreasing by an order at 1 cm length near the separatrix. 8 mm thick well formed flux of plasma appears at the divertor plate. Divertor power efficiency at different modes of operation is 50- 70 %. As compared to the TO-1 nondivertor tokamak some plasma filament hot zone expansion is recorded in the TO-2 tokamak.

45225 **(IAEA-R—1882-F) Radiation damage studies in fusion reactor materials. Part of a coordinated programme on energetic particle interactions with materials of importance for fusion reactors. Final report for the period 1 February 1977 - 15 December 1980.** Mehta, M.K. (International Atomic Energy Agency, Vienna (Austria)). May 1982. 10p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702866.

This paper constitutes the final report (IAEA Research Contract No. 1882/RB) on Radiation Damage Studies in Fusion Reactor Materials (Sputtering and Blistering) performed at the Research Centre of Bhabha, India.

45226 **(ILE—8123P) Measurements of ablation pressure and mass ablation rate using a target pendulum and a thin foil target at 10 μm laser wavelength.** Daido, H.; Tateyama, R.; Ogura, K.; Tsujimoto, A.; Fujita, H. (Osaka Univ., Suita (Japan). Inst. of Laser Engineering). 21 Oct 1981. 17p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702868.

The ablation pressure and the mass ablation rate for 10 μm laser were measured using two methods of a target pendulum and shifted X-ray emission images which was equivalent to X-ray backlighting. The measured ablation pressure was 10 Mbar and the mass ablation rate was 10^6 g/cm^2.sec at the absorbed laser intensity of 5 x 10^{13} W/cm^2. Comparing the ablation mass rate measured by the pendulum with that derived from the penetration depth of the hot electrons using K sub(α) line emission, we could identify the hot electron driven ablation as a dominant process of the ablation in the case of 10 μm wavelength. Our results were also compared with the theory of hot electron driven ablation using a self regulated flow model.

45227 **(ILE—8125P) Pulse propagation properties in high-power CO_2 laser system for laser fusion.** Daido, H.; Inoue, M.; Fujita, H.; Matoba, M.; Nakai, S. (Osaka Univ., Suita (Japan). Inst. of Laser Engineering). 1 Nov 1981. 16p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702869.

The simulation results of nonlinear propagation properties in the CO_2 laser system using a simulation model of the SF_6 saturable absorbers and the CO_2 laser amplifiers agree well with the experimental results. The technical problems of the simultaneous irradiation of the multi-beams to a target are also discussed.

45228 **(ILE—8126P) Numerical calculations of the ray trace, absorption distribution and absorption efficiency of the laser beam in spherical symmetric plasmas.** Sakabe, S.; Mochizuki, T.; Yamanaka, C. (Osaka Univ., Suita (Japan). Inst. of Laser Engineering). 11 Nov 1981. 25p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702870.

The computer code "ABS", which can calculate the absorption rate and distribution of the laser light in spherical symmetric plasmas has been developed. The dependences of the absorption rate and distribution on the focusing position and their wavelength dependences were obtained. It was found that with a shorter wavelength laser light, the absorption nonuniformity on the fusion pellets will be reduced as well as the absorption rate will increase.

45229 (INIS-SU—136, pp 24-30) **Transients in shock-excited homopolar generator with exciting winding as an inductive storage.** Kharitonov, V.V. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01.

In Electrophysical apparatus. Issue 18. Collection of articles.

Calculation ratios necessary for the choice of the basic dimensions and evaluation of efficiency of energy conversion for the homopolar shock-excited generator (HSG) combined with inductive energy storage are presented. As for the design the HSG armature is a "squirrel cage" fixed on a non-conductive cylinder. It is shown that at HSG self excitation the maximum current in the short circuit ring is much less than the maximum current at the energy outlet and it essentially depends on the active resistance of the ring. Advisability of increasing active resistance of the short circuit rings in HSG design is shown.

45230 (INIS-SU—136, pp 16-24) **Shock-excited homopolar generator as inductive energy storage.** Baranov, G.A.; Bezgachev, E.A.; Karasev, B.G.; Larionov, B.A.; Kharitonov, V.V. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01.

In Electrophysical apparatus. Issue 18. Collection of articles.

The main aspects of developing a combined pulse power system on the base of the shock-excited homopolar generator (SHG) are discussed. It is suggested that the SHG excitation winding or current-hearing elements of the armature should be used as an inductive energy storage (IS). Presented are the calculation technical-economical parameters of some combined power systems on the base of SHG cylindrical type with rod armature, active loading, excitation winding - copper with natural air cooling, current collectors-with solid copper-graphite brushess - whown are the ways of solving the problem of developing a large power system capable of transmitting 10 mJ energy to the active loading; the maximum current is 2x10^{7}A, dimensions are 2x2x1.5 m. This power system is shown to cost 70000 rubles.

45231 (INIS-SU—136, pp 102-108) **5 KV low-induction capactitor battery.** Babalin, A.I.; Burtsev, V.A.; Emel'yanov, A.I.; Kunaev, G.T.; Ovsyannikov, V.A.; Zhmodikov, B.S. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01.

In Electrophysical apparatus. Issue 18. Collection of articles.

A 1.2 MJ capacitor battery is developed and constructed for creating strong magnetic fields for thermonuclear facilities, pumping of laser active media. The capacitor battery is assembled of 512 IMU5-150 and 128 IS5-200 capacitors. The design is based on division of the capacitor battery in 40 sections. The energy commutation is performed by air spark gaps of the trigatron type with 24 to 60 nH inductance. Electromagnetic switches are made on the base

of the EP 41V-33 relay. A low-induction generator is developed for spark gap ignition. The capacitor sections, each of them comprising 16 capacitors, and loadings are switched-in either by means of cables or flat lines. Accidents were not observed during operation of 20 sections of the capacitor battery (capacitors break-down, break of polyethylene isolation, deformation of tyre-wires).

45232 (INIS-SU—136, pp 69-78) **Analysis of the stress of a tokamak device vacuum chamber depending on the position of supports.** Samojlenko, V.D.; Spirchenko, Yu.V.; Chvartatskij, R.V. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01.

In Electrophysical apparatus. Issue 18. Collection of articles.

The problem of mechanical strength of a tokamak electic-discharge chamber is solved by means of the algorithm. The strength analysis is reduced to investigation of stressed state of rings being under the effect of distributed mechanical and temperature loadings. The investigation has been conducted for a number of supports n<=4 at their symmetric location relatively to the horizontal axis. The maximum bending momentum occurring under the effect of external distributed loading and temperature has been considered as a criterion characterizing the stressed state of the vacuum chamber. It is concluded that at the determined number of supports their location essentially affects the bending momentum. Determination of the optimum number and location of supports of the vacuum chamber should be executed under the combined effect of external and temperature loadings.

45233 (INIS-SU—136) **Electrophysical apparatus. Issue 18. Collection of articles.** (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow; Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1981. 113p. (In Russian). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780875.

Separate abstracts were prepared for each of the icluded papers.

45234 (INIS-SU—137, pp 21-23) **Equilibrium of the toroidal field winding in tokamaks.** Vaulina, I.G.; Karnaukh, V.A.; Semenov, O.V.; Spirchenko, Yu.V. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

In Eletrophysical apparatus. Issue 19. Collection of articles.

Retention of the toroidal field coils from tipping with side forces in tokamaks is one of the main engineering problems. Reactive restoring momentum acts in the structural version of the facility with a supporting cylinder at the absense of arched thrust between coils on the curvilinear surface of the coil and cylinder contact. This momentum is proportional to the coil gravitation force towards the facility center. Experimental test of the given dependence has been carried out on models of the supporting cylinder and the toroidal field coil of the T-15 facility made of steel in the scale 1-10. The coil model is made in two versions with different angles of clasping. Experimental results and theoretical dependences are presented. It is concluded that: all the experimental results are in the range between theoretical straight lines; with the increase of specific pressure the experimental results approach the theoretical straight line corresponding to the distribution of the reactive force according to the law of triangle.

45235 (INIS-SU—137, pp 16-20) **Mechanical strength calculation of the disk type windings with elastic couplings by the finite element method.** Sivkova, G.N.; Spirchenko, Yu.V.; Chvartatskij, P.V. 1981. (In Russian). NTIS (US Sales Only), PC A04/MF A01.

In Eletrophysical apparatus. Issue 19. Collection of articles.

Stressed-deformed state of toroidal field coils of the disc type with elastic couplings of the tokamaks has been investigated with provision for the effect of the central core pliability by means of the two-dimensional version of the finite element method. Numerical solution of the finite element method is performed by means of the ES 1040 computer according to the computer code permitting taking account of boundary conditions of elastic support. The calculation has been performed using as the example the project of T-20 facility coil of the disc type. Consideration of pliability of the central core of the facility inductor is accomplished by the introduction of additional rigidities to the complete matrix of rigidity. Scheme of the structure distretization includes 141 units, 211 elements. The accuracy of solution depends on the reduction accuracy of the volume load to unit forces and on the number of finite elements. Analysis of the solution convergence is performed by the comparison of solutions obtained for three different schemes of the disk discretization without regard for the inductor pliability. The comparative analysis of the results shows that transfer epures for all the three discretization versions practically coincide and stresses differ not more than by 10%. On the whole the above investigation has demonstrated good convergence of the problem solution.

45236 (INIS-SU—137) **Eletrophysical apparatus. Issue 19. Collection of articles.** (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow; Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)). 1981. 73p. (In Russian). NTIS (US Sales Only), PC A04/MF A01. Order Number DE83780876.

Abstracts for each paper were entered into the data base. (MOW)

45237 (INIS-SU—147, pp vp) **Features of arc formation on the limiter with a dielectric film in current discharge.** Volkov, Yu.F.; Vollov, E.D.; Gribanov, Yu.A.; Dyatlov, V.G.; Mitina, N.I.; Sizonenko, V.L. 1981. (In Russian). NTIS (US Sales Only), PC A06/MF A01. (CONF-810293—No.5).

From 2. all-union conference on radiation physics of solids; Zvenigorod, USSR (24 Feb 1981).

The effect of an Al_2O_3 oxide dielectric film on arc formation at plasma parameters approaching those of a near-wall plasma in a fusion reactor is investigated. Theoretical estimates are given of electric field strengths generated in the dielectric film by space charges due to electron- and ion flows out of the plasma and film breakdown conditions. This (up to 30 A) film breakdown is shown to be able to induce unipolar ares, whereas breakdown of thicker films might not lead to arc formation. Experiments have shown that Al_2O_3 coatings up to 30 A thick support arc formation. With thicknesses exceeding 50 A substrate erosion decreases by an order of magnitude though the local damages observed are more severe. The micropoints were observed formed in the cathode spot region due to electrostatic forces. The authors conclude that it is possible to protect fusion reactor elements from arcs using dielectric films.

45238 (INS-NUMA—28, pp 7-15) **Ion-beam-driven inertial confinement fusion. An overview.** Obayashi, H. (Nagoya Univ. (Japan). Inst. of Plasma Physics). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

Review of the study on ion beam-driven inertial confinement fusion is presented. A group for the design work of inertial confinement fusion (ICF) was organized. The objectives of this working group are to assess the present status and future prospect of ion beam-driven ICF approach, to carry out the design work of a reactor system, and thereby to find out the critical issues to be overcome both on physical and technological sides, and to promote the interdisciplinary collaboration work on fusion reactor analysis in this country. Laser photons, relativistic electron beam (REB), light ion beam (LIB), and heavy ion beam (HIB) are the candidates of ICF energy carriers. Short comparison of different beam types is presented. The main problems at present are LIB drivers, HIB drivers, target pellets, and reactor vessels. A formula for required driver energy is described. The typical values of the mass density and number density of pellets, driver energy, driver power and energy deposit are estimated. The items to be considered in more detail throughout the work are summarized.

45239 (INS-NUMA—28, pp 112-125) **Final beam transport in the reactor chamber.** Yamaki, T. (Nagoya Univ. (Japan). Dept. of Physics). Apr 1981. NTIS (US Sales Only), PC A07/MF A01. (CONF-8010330—).

From Symposium on inertial fusion with heavy ion beam; Tokyo, Japan (22 Oct 1980).

The beam transport in heavy ion fusion (HIF) accelerators is discussed. The qualitative features of transport effects are presented. The basic transport effects associated with HIF beam are space charge effects, atomic physics effects, zero-order plasma effects, and plasma instabilities. In the case of HIF, very high intensity of HIF beam is required, and its own electric repulsion does not keep the beam converging. The number of beams required for supplying the demand power at a target can be estimated. The beam charge deposited on a target pellet produces electrostatic potential, and the electrostatic repulsion prevents the beam to reach on the target. The upper limit of the gas pressure is determined by small angle Coulomb scattering. Since unneutralized beam has the pinching force, the electrostatic kink mode (wiggle mode) should be considered in the pressure region where beam neutralization does not occur. Two-stream instability, filamentation instability and self-pinched transport are considered. As a conclusion of this paper, the new first choice for HIF transport is to use ballistic transport in moderate vacuum.

45240 **(INT—156/J) Neutron multiplier alternative for fusion reactor blankets.** Taczanowski, S. (Institute of Physics and Nuclear Techniques, Krakow (Poland)). 1980. 14p. NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702873.

A proposal is given to replace neutron multiplier needed to enable low lithium and tritium inventories simultaneously assuring sufficient production of tritium, by an efficient moderator (^{7}LiH or ^{7}LiD). The advantageous effect of the intensified neutron energy degradation is due to the 1/v character of the main tritium producing reaction. The slowing-down medium is designed to be the source of moderated neutrons for the surrounding Li (^{6}Li enriched) region where the most of tritium is to be produced. The surplus tritium production remains stored in the moderator zone. Some preliminary calculations illustrating the above concept were carried out and the neutron flux and tritium production distributions are presented. The indications regarding further studies are also suggested.

45241 (IPPCZ—244, pp 3-13) **Tokamak research in the Soviet Union.** Strelkov, V.S. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Important milestones on the way to the tokamak fusion reactor are recapitulated. Soviet tokamak research concentrated at the I.V. Kurchatov Institute in Moscow, the A.F. Ioffe Institute in Leningrad and the Physical-Technical Institute in Sukhumi successfully provides necessary scientific and technological data for reactor design. Achievments include, the successful operation of the first tokamak with superconducting windings (T-7) and the gyrotron set for microwave plasma heating in the T-10 tokamak. The following problems have intensively been studied: Various methods of additional plasma heating, heat and particle transport, and impurity control. The efficiency of electron-cyclotron resonance heating was demonstrated. In the Joule heating regime, both the heat conduction and diffusion rates are anomalously high, but the electron heat conduction rate decreases with increasing plasma density. Progress in impurity control makes it possible to obtain a plasma with effective charge approaching unity.

45242 (IPPCZ—244, pp 39-40) **Hf apparatus for plasma heating at lower hybrid resonance on tokamak T-7.** Datlov, J.; Jakubka, K.; Klima, R.; Kopecky, V.; Preinhaelter, J.; Stoeckel, J.; Zacek, F. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45243 (IPPCZ—244, pp 41-46) **Power spectrum optimization of the three-waveguide grill for the T-7 tokamak.** Preinhaelter, J.; Sedlacek, Z.; Koerbel, S. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

Optimum conditions are found for plasma heating and current driving for the three-waveguide grill developed in the Institute of Plasma Physics, Prague, for experiments with lower hybrid resonance heating of a plasma in the T-7 tokamak at the Kurchatov Institute. In the theoretical model the height of waveguides is assumed to be infinite, and the linear density gradient is perpendicular to the toroidal magnetic field. A narrow vacuum gap is situated between the plasma and the grill mouth. The following quantities are computed in dependence on the phase difference of the fields in the adjacent waveguides: the wave reflection coefficients in all waveguides, the total power efficiency, the plasma heating efficiency, the efficiency of current generation, and the power loss. The dependences of these quantities on the plasma density gradient for the optimum value of the phase difference (90deg) are also given. The grill efficiency sharply decreases for low density gradients.

45244 (IPPCZ—244, pp 94-100) **Fusion at counterstreaming ion beams - ion optic fusion (IOF).** Gryzinski, M. (Institute of Nuclear Research, Warsaw (Poland)). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The results of investigation are briefly reviewed in the field of ion optic fusion performed at the Institute of Nuclear Research in Swierk. The ion optic fusion concept is based on the possibility of obtaining fusion energy at highly ordered motion of ions in counterstreaming ion beams. For this purpose TW ion beams must be produced and focused. To produce dense and charge-neutralized ion beams the selective conductivity and ballistic focusing ideas were formulated and used in a series of RPI devices with low-pressure cylindrical discharge between grid-type electrodes. 100 kA, 30 keV deuteron beams were successfully produced and focused into the volume of 1 cm^{3}, yielding 10^{9} neutrons per 200 ns shot on a heavy ice target. Cylindrically convergent ion beams with magnetic anti-defocusing were proposed in order to reach a positive energy gain at reasonable energy level.

45245 (IPPCZ—244, pp 107-108) **Ion velocity measurements for laser mass ablation studies.** Pina, L. (Ceske Vysoke Uceni Technicke, Prague (Czechoslovakia). Fakulta Jaderna a Fysikalne Inzenyrska). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45246 (IPPCZ—244, pp 109-111) **Crater formation by high current discharges in vacuum.** Siemroth, P.; Juettner, B. (Akademie der Wissenschaften der DDR, Berlin. Zentralinstitut fuer Elektronenphysik). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The form of crater-like erosion marks arising on the cathode of vacuum arcs reflects both the essential discharge processes and conditions prevailing at surface. The crater formation time is of the order of a few nanoseconds, exceeding the characteristic time of the stationary heat conduction by 1 to 3 orders of magnitude. At currents above 100 A the spots split, several craters being formed simultaneously. As the splitting time is of the order of the crater formation time, splitting is impossible with current rise time rates above 10^{9} A.s^{-1}. The validity of such a model was confirmed by experiments with nanosecond high-current discharges. Only the initial stage of crater splitting was observed. Macrocraters formed during short high-current discharges reflect the same heating and propagation mechanisms as do craters in the low-current case, further proving the extremely nonstationary nature of the crater formation process.

45247 (IPPCZ—244, pp 116-117) **8-stage, 23-kJ, 1-MV Marx generator.** Bohacek, V. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

45248 (IPPCZ—244, pp 143-148) **Global model of a hybrid tokamak reactor with an auxiliary rf heating.** Krlin, L.; Pavlo, P.; Tluchor, Z. (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. NTIS (US Sales Only), PC A21/MF A01. (CONF-8110277—).

From 11. Czechoslovak seminar on plasma physics and technology; Zvikov, Czechoslovakia (7 Oct 1981).

The first estimations are presented of basic parameters of a hybrid tokamak reactor. In the model the lower hybrid resonance heating mechanism is considered. The output power, the power deposited by alpha particles, the rf power absorbed in the plasma and the resulting driven current are calculated as is the production rate of plutonium. The usual pulsed tokamak regime is assumed. The torus and blanket parameters were chosen approaching those used in the recent NIIEFA study. A strong dependence was found of the plutonium production rate on the minor plasma radius. The calculated value of the driven current is comparable with that of the plasma current. This fact indicates the feasibility of achieving the steady-state regime in a hybrid tokamak reactor.

45249 (IPPCZ—244) **11th Czechoslovak seminar on plasma physics and technology.** (Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu). Oct 1981. 479p. NTIS (US Sales Only), PC A21/MF A01. Order Number DE83780863.

Separate abstracts were prepared for each paper. (MOW)

45250 (KEK—81-2, pp 95-103) **Vacuum system of the Heliotron E high temperature plasma system.** Sasaki, A.; Sato, M. (Kyoto Univ. (Japan)). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

The Heliotron E was designed for the plasma confinement and the plasma heating in the heliotron magnetic field. The major radius of the vacuum chamber is 2.2 m, and the chamber was made of YUS 170 (25 Cr - 12 Ni - 0.3 N). The baking of the vacuum chamber was made with heated oil flowing in the pipe wound on the outer surface of the chamber. The highest temperature is 110 degree C. The low power AC discharge cleaning can be made. The designed vacuum is 2×10^{-8} Torr. The main vacuum pumps are turbo-molecular pumps with pumping rate of 2400 l/s each. The vacuum of 8.7×10^{-9} Torr in the manifold was achieved in the test operation after 72 hours baking. A neutral beam injection (NBI) system is provided for the Heliotron E. A differential pumping system with cryopumps is equipped. The panel surface is SUS 316, and cooled by liquid helium. The gas for plasma production is mostly hydrogen, and its required purity is more than 99.99 percent. The gas injection can be made through an electromagnetic valve.

45251 (KEK—81-2, pp 104-116) **Surface cleaning by electron cyclotron resonance hydrogen plasma.** Sakamoto, Y.; Ishibe, Y.; Yano, K.; Oyama, H. (Institute of Physical and Chemical Research, Wako, Saitama (Japan)). Apr 1981. (In Japanese). NTIS (US Sales Only), PC A07/MF A01. (CONF-800194—).

From 3. meeting on ultra high vacuum techniques for accelerators and storage rings; Oho, Ibaraki, Japan (24 Jan 1980).

Electron cyclotron resonance (ECR) discharge cleaning was studied. The reduction of metallic oxide by ECR hydrogen plasma was investigated. It was possible, by the proper combination of gas pressure and microwave power, to produce the plasma suitable for discharge cleaning. Experiments on the reduction of the oxides of Cu, Ni, Fe, Mo, Ti and Al by ECR plasma were performed, and the ECR method can be useful for discharge cleaning. A model of reduction mechanism was considered. The ECR method was applied to the cleaning of JFT-2. The average input power and the performance characteristics of cleaning were measured, and compared with those of the Taylor discharge cleaning (TDC). Appreciable difference between both cleaning methods was not found. When more input power of microwaves can be applied, the cleaning time by the ECR method may be reduced.

45252 **(KFTI—82-12) Plasma equilibrium in a three-turn stellarator with correcting cross field.** Kuznetsov, Yu.K.; Mikhajlov, M.I.; Pashnev, V.K.; Tonkopryad, V.M. (AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.). 1982. 21p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702877.

Theoretical and experimental studies on a possibility of using the automatically controlled cross field for increasing the maximum gas kinetic plasma preasure in a three-turn stellarator are performed. Within the framework of a simplified theoretical model various laws of cross field control using feed— back are analysed. It is shown that the control scheme based on magnetic measurements can ensure necessary accuracy of maintaining equilibrium near the optimum. Experimental data concerning equilibrium effects obtained at the stellarator "URAGAN" are in a satisfactory agreement with the theory.

45253 **(LA—9687-MS) Design and testing of a prototype water-cooled vacuum interrupter for use in superconducting-magnet protection circuits.** Parsons, W.M. (Los Alamos National Lab., NM (USA)). May 1983. Contract W-7405-ENG-36. 32p. NTIS, PC A03/MF A01. Order Number DE83014803.

A water-cooled vacuum interrupter was designed and tested for use at 25 kA and 10 kV. This device is expected to have a lifetime approximately one order of magnitude greater than commercial dc circuit breakers. Testing showed that, although the device could successfully carry and interrupt 25 kA, interruption reliability was only about 95% with a 10 kV recovery voltage. In addition, a structural crack developed in one electrode from either thermal or mechanical stresses or a combination thereof. Details of design and testing are presented, and modifications are proposed to improve reliability and reduce the thermal and mechanical stresses in the next prototype.

45254 **(LA—9755-PR) Tokamak poloidal-field systems. Progress report, January 1-December 31, 1982.** Rogers, J.D. (comp.). (Los Alamos National Lab., NM (USA)). May 1983. Contract W-7405-ENG-36. 33p. NTIS, PC A03/MF A01. Order Number DE83014801.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The work performed in support of the FED and INTOR tokamak studies is reported at length and covers almost all the aspects of poloidal field (PF) design that were considered. The design work included magnetics, forces and fields, superconductor design, superconductor loss calculations, high field tokamak central solenoid parametric analysis, helium vapor release with bubble clearing and entrainment analysis, eddy current losses in dewars, structural support design for internally cooled cable superconductor (ICCS), research and technology development and manufacturing plans and milestones for poloidal field (PF) coils, fault conditions for shorted PF coils, design of 50 kA vapor cooled leads, and structural design of PF ring coils box frame dewars. Eddy current calculations in tokamak structure are being calculated. A computer code to perform stability analysis of ICCS is being written. Two water cooled switches, a vacuum interrupter and a bypass switch, were tested to develop improved higher current carrying capacities.

45255 **(LA—9761-MS) Neutron streaming through straight and single bend slots.** Urban, W.T. (Los Alamos National Lab., NM (USA)). Jul 1983. Contract W-7405-ENG-36. 17p. NTIS, PC A02/MF A01. Order Number DE83015178.

Calculations have been performed using the Monte Carlo code MCNP to determine the neutron streaming through various straight and single-bend slots in a one-meter-thick shield. A uniform plane source emitting 14-MeV neutrons with a cosine angular distribution was used in the analyses. The results obtained have direct

implications regarding neutron-streaming problems that will be encountered in the shielding analyses of tokamak fusion reactors which are constructed from pie-shaped shield/vacuum chamber segments.

45256 **(ORNL/FEDC—83/1) FED-A, an advanced performance FED based on low safety factor and current drive.** Peng, Y.K.M.; Rutherford, P.H. (Oak Ridge National Lab., TN (USA)). Aug 1983. Contract W-7405-ENG-26. 465p. NTIS, PC A20/MF A01. Order Number DE83015072.

The FED-A study aims to quantify the potential improvement in cost-effectiveness of the Fusion Engineering Device (FED) by assuming low safety factor q (less than 2 as opposed to about 3) at the plasma edge and noninductive current drive (as opposed to only inductive current drive). The FED-A performance objectives are set to be : (1) ignition assuming International Tokamak Reactor (INTOR) plamsa confinement scaling, but still achieving a fusion power amplification $Q \geq 5$ when the confinement is degraded by a factor of 2; (2) neutron wall loading of about 1 MW/m^2, with 0.5 MW/m^2 as a conservative lower bound; and (3) more clearly power-reactor-like operations, such as steady state.

45257 **(ORNL/TM—8601) Model for pneumatic pellet injection.** Hogan, J.T.; Milora, S.L.; Schuresko, D.D. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 29p. NTIS, PC A03/MF A01. Order Number DE83014891.

A hydrodynamic code has been developed to model the performance of pneumatic pellet injection systems. The code describes one dimensional, unsteady compressible gas dynamics, including gas friction and heat transfer to the walls in a system with variable area. The mass, momentum, and energy equations are solved with an iterated Lax-Wendroff scheme with additional numerical viscosity. The code is described and comparisons with experimental data are presented.

45258 **(TRITA-PFU—82-06) Toroidal Extrap Equilibria.** Scheffel, J. (Royal Inst. of Tech., Stockholm (Sweden). Plasma Physics and Fusion Research). Apr 1982. 34p. NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701062.

Ideal MHD-equilibria for the toroidal EXTRAP configuration have been computed with an equilibrium code. The free-boundary problem is solved by using the condition that the current density is proportional to r on a flux surface. It is found that the toroidal Z-pinch, initially induced in the central zero-field region of a transverse octupole field, drifts radially outwards producing an inverse-D shaped cross-section. The plasma current of this high-beta equilibrium may be increased if the plasma is pushed back by altering the external confining magnetic field as demonstrated.

45259 **(UCAR—10042-82) National Mirror Fusion Program Plan.** Gerich, C.A. (ed.). (Lawrence Livermore National Lab., CA (USA)). Aug 1982. Contract W-7405-ENG-48. 124p. NTIS, PC A06/MF A01. Order Number DE83002653.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

This Plan is current as of August 1982. The major milestones listed herein represent an aggressive, success-oriented program paced primarily by technical results. Consistent with applicable government policies and the overall program planning of the Department's Office of Fusion Energy, this Plan assumes approval of the Mirror Program's next major step beyond MFTF-B - a deuterium-tritium (D-T) burning engineering reactor called the Fusion Power Demonstration (FPD) facility (formerly the Tandem Mirror Next Step). The near-term goal of the tandem mirror program is to lay the scientific and technical groundwork for an economically attractive, D-T fusion reactor design before the end of the 1980s. Construction of the FPD facility based on the tandem mirror could be initited around 1988. A second phase, complete with a nuclear power blanket demonstration, could be initiated in the mid-1990s, based on nuclear engineering data from a facility such as the Technology Demonstration Facility (TDF) described below. The outline of an acceptable tandem mirror reactor (TMR) design was first published in 1981, and will be further developed and described in the Mirror Advanced Reactor Study (MARS) during FY 1982-1983.

45260 **(UCID—19808) Alternative connections for the large MFTF-B solenoids.** Owen, E.W.; Shimer, D.W.; Wang, S.T. (Lawrence Livermore National Lab., CA (USA)). 20 May 1983. Contract W-7405-ENG-48. 77p. NTIS, PC A05/MF A01. Order Number DE83015191.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The MFTF-B central-cell solenoids are a set of twelve closely coupled, large superconducting magnets with similar but not exactly equal currents. Alternative methods of connecting them to their power supplies and dump resistors are investigated. The circuits are evaluated for operating conditions and fault conditions. The factors considered are the voltage to ground during a dump, short circuits, open circuits, quenches, and failure of the protection system to detect a quench. Of particular interest are the current induced in coils that remain superconducting when one or more coils quench. The alternative connections include separate power supplies, combined power supplies, individual dump resistors, series dump resistors and combinations of these. A new circuit that contains coupling resistors is proposed. The coupling resistors do not affect normal fast dumps but reduce the peak induced currents while also reducing the energy rating of the dump resistors. Another novel circuit, the series circuit with diodes, is discussed in detail.

45261 **(UCRL—15537) Rayleigh-Taylor instability and resulting failure modes of ablatively imploded inertial-fusion targets.** Montierth, L.; Morse, R. (Lawrence Livermore National Lab., CA (USA)). 15 Apr 1983. Contract W-7405-ENG-48. 22p. NTIS, PC A02/MF A01. Order Number DE83014838.

This article presents a theory of these instabilities and potential modes of failure caused by them. Discussions are given for the following: small amplitude growth of the outside surface instability; and modes of failure resulting from nonlinear development of the inside surface instability.

45262 **(UCRL—87700) Use of fusion-welding techniques in fabrication of a superconducting-magnet thermal-shield system.** Dalder, E.N.C.; Berkey, J.H.; Chang, Y.; Johnson, G.L.; Lathrop, G.H.; Podesta, D.L.; Van Sant, J.H. (Lawrence Livermore National Lab., CA (USA)). 10 Jun 1983. Contract W-7405-ENG-48. 34p. (CONF-830485—3). NTIS MF A01. Order Number DE83014869.

From 64. annual American Welding Society meeting; Philadelphia, PA, USA (24 Apr 1983).

Microfiche only, copy does not permit paper copy reproduction.

Success of the thermal shield system was demonstrated by the results of acceptance tests performed with the magnet and all its ancillary equipment. During these tests the thermal shield system was: (1) thermally cycled several times from 300°K to 77°K; (2) pressure cycled several times from 0 to 5 atmospheres; (3) operated for more than 500 hours at 77°K and in a vacuum environment of less than 10^{-6} torr; (4) operated in a magnetic field up to 6.0 Telsa; (5) exposed to a rapidly collapsing magnetic field of more than 250 gauss per second; (6) drained of all LN_2 in a few minutes, without any weld failures. The successful (and relatively problem free) operation of the magnet system validates the choice of the welding processes used, as well as their execution in both shop and field environments.

45263 **(UCRL—88872) US-DOE Fusion-Breeder Program: blanket design and system performance.** Lee, J.D. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 38p. (CONF-830632—5). NTIS, PC A03/MF A01. Order Number DE83014950.

From 3. international conference on emerging nuclear energy systems; Helsinki, Finland (6 Jun 1983).

Conceptual design studies are being used to assess the technical and economic feasibility of fusion's potential to produce fissile fuel. A reference design of a fission-suppressed blanket using conventional materials is under development. Theoretically, a fusion

breeder that incorporates this fusion-suppressed blanket surrounding a 3000-MW tandem mirror fusion core produces its own tritium plus 5600 kg of ^{233}U per year. The ^{233}U could then provide fissile makeup for 21 GWe of light-water reactor (LWR) power using a denatured thorium fuel cycle with full recycle. This is 16 times the net electric power produced by the fusion breeder (1.3 GWe). The cost of electricity from this fusion-fission system is estimated to be only 23% higher than the cost from LWRs that have makeup from U_3O_8 at present costs (55 $/kg). Nuclear performance, magnetohydrodynamics (MHD), radiation effects, and other issues concerning the fission-suppressed blanket are summarized, as are some of the present and future objectives of the fusion breeder program.

45264 **(UCRL—89016) Uses of ORACLE in the Nova Laser Control System.** McGuigan, D.L. (Lawrence Livermore National Lab., CA (USA)). 1983. Contract W-7405-ENG-48. 11p. (CONF-830883—2). NTIS, PC A02/MF A01. Order Number DE83014947.

From 2. international ORACLE user group conference; Boston, MA, USA (14 Aug 1983).

The Nova Laser System is a large-scale fusion experiment being constructed at the Lawrence Livermore National Laboratory. Modern control system technology is required to efficiently manage the thousands of devices needed to operate the system. In order to reduce the requirements on the operations staff, much of the system is being automated. This requires a significant knowledge base including frequently used system configurations and device parameters. We will be using ORACLE to provide this information to the control system. To insure the control-system integrity, ORACLE will be used to maintain information about the control-system software. This information will be used to document the system as well as help track down problems. ORACLE will also be used to maintain data on the system performance. This data will be analyzed to optimize the laser performance and point out when maintenance is required.

45265 **(UCRL—89396) Use of ORACLE in a scientific environment.** Carey, R.W.; Auerbach, J.M.; Lerche, R.A.; Demartini, B.J. (Lawrence Livermore National Lab., CA (USA)). 22 Jun 1983. Contract W-7405-ENG-48. 8p. (CONF-830883—1). NTIS, PC A02/MF A01. Order Number DE83014952.

From 2. international ORACLE user group conference; Boston, MA, USA (14 Aug 1983).

This paper discusses the use of ORACLE at the Fusion Experiments Analysis Facility (FEAF) for the laser program of the Lawrence Livermore National Laboratory. The mission of this VAX based computing facility is to aid laser program scientists and engineers develop their understanding of inertial confinement fusion target behavior. We have incorporated the ORACLE DBMS as a major part of an integrated data management and analysis environment for accomplishing this task. We discuss our use of ORACLE through all phases of data processing from raw digital forms to final physics summary data. Applications include: an information management tool for maintaining large amounts of one- and two-dimensional data, a configuration management tool for experiment setup information, and a data analysis tool for maintaining calibration and sensor response data.

45266 (UTNL-R—0092, pp 7-22) **Heat structural problems in JT-60.** Takatsu, H.; Shimizu, M.; Yamamoto, M.; Nakamura, H. (Japan Atomic Energy Research Inst., Tokai, Ibaraki. Tokai Research Establishment); Miyauchi, Y. May 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-8002105—).

From Study meeting on heat transfer and structural problems in nuclear facilities; Tokai, Japan (4 Feb 1980).

The construction of JT-60 is in progress to study the behavior of hydrogen plasma. The D-T reaction does not occur in this device, therefore the considerations for neutron damage, tritium leakage and so on are not necessary. The long-pulse operation will be done, and the suppression of the production and mixing of impurity is considered in the design of the JT-60. The high temperature baking is possible, and the magnetic limiter is set. The vacuum container has the complex structure consists of 8 sector type thick rings and 8 U-shaped bellows, and has egg-shaped cross section. The main radius of the torus is about 3 m. The material of the vacuum container is INCONEL 625. The analyses of various stresses due to such as atmospheric pressure, eddy current and thermal expansion were made. It is also necessary to consider the thermal stress due to the leakage of neutral beam. The thermal input of about 20 MW per one discharge to the first wall is taken into consideration. The material of the first wall is molybdenum.

45267 (UTNL-R—0092, pp 32-45) **Dynamic breaking phenomena of structures under electromagnetic field.** Masuda, M. (Tokyo Univ. (Japan)). May 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-8002105—).

From Study meeting on heat transfer and structural problems in nuclear facilities; Tokai, Japan (4 Feb 1980).

The experimental and analytical studies on the breaking phenomena under electromagnetic field are described. Magnetic field is applied to test specimens which have a crack on one side. Unsteady current flows in the specimens. Then, the specimens bend due to the Lorentz force caused. The analyses of steady current distribution and the skin effect of unsteady current were made. Then, the stress intensity factor was obtained. A discharge circuit was designed, and used for the source of unsteady current. The waveform of the current, the deflection of the specimens, the strain as the crack end and the mouth-opening displacement were measured. It was found that the current distribution at the crack end showed the characteristic feature of the reciprocal of square-root r, and the results of the experiment were in good agreement with those of the analysis.

45268 (UTNL-R—0092, pp 46-60) **Survey of studies on the flow and heat transfer of two-component, two-phase flow of liquid metal in magnetic field.** Kumamaru, H. (Tokyo Univ. (Japan). Faculty of Engineering). May 1980. (In Japanese). NTIS (US Sales Only), PC A06/MF A01. (CONF-8002105—).

From Study meeting on heat transfer and structural problems in nuclear facilities; Tokai, Japan (4 Feb 1980).

Brief review of the studies on the flow and heat transfer of two-component, two-phase flow of liquid metal in magnetic field is presented. R.J. Thome measured the distribution of void rate, slip ratio and pressure loss for the two-phase flow of NaK-N_2 under vertical magnetic field. The void rate distribution became even and the slip ratio increased with the increasing magnetic field. The experimental results of pressure loss was compared with the calculation by an equation derived from the homogeneous flow model. R.G. Owen et al. made the analytical studies of the MHD friction loss of two phase flow. Michiyoshi et al. made experimental studies on the hydrodynamic local properties of Hg-Ar two-phase flow of slug region in a vertically ascending tube under magnetic field, and Kimi et al. also made studies on the heat transfer of Hg-Ar flow under magnetic field. Saito et al. measured the slip ratio and pressure loss of NaK-N_2 flow. As a whole, it can be said that the average void rate decreases, and its distribution becomes even under magnetic field. The slip ratio increases, and the friction loss factor becomes nearly one. It was hard to make clear the heat transfer characteristics.

45269 **(UTNL-R—0092) Report of study meeting on heat transfer and structure problems in nuclear facilities, 1979.** (Tokyo Univ., Tokai, Ibaraki (Japan). Nuclear Engineering Research Lab.). May 1980. 116p. (In Japanese). (CONF-8002105—). NTIS (US Sales Only), PC A06/MF A01. Order Number DE83780865.

From Study meeting on heat transfer and structural problems in nuclear facilities; Tokai, Japan (4 Feb 1980).

Separate abstracts were prepared for each of the included papers. (MOW)

45270 **Uniformity of energy deposition for laser driven fusion.** Skupsky, S.; Lee, K. (Laboratory for Laser Energetics, University of Rochester, Rochester, New York 14623). *Journal of Applied Physics;* **54**: No. 7, 3662-3671(Jul 1983). Contract AC08-80DP40124.

Laser driven fusion requires a high degree of uniformity in laser energy deposition in order to achieve the high density compressions required for sustaining a thermonuclear burn. The characteristic nonuniformities produced by laser irradiation, with multiple

overlapping beams, are examined for a variety of laser-target configurations. Conditions are found for which the rms variation in uniformity is less than 1%. The analysis is facilitated by separating the contributions from (1) the geometrical effects related to the number and orientation of the laser beams and (2) the details of ray trajectories for the overlapping beams. Emphasis is placed on the wavelength of the nonuniformities in addition to their magnitudes, as the shorter wavelength nonuniformities are more easily smoothed by thermal condution within the target. It is demonstrated how the geometrical symmetry of the laser system effectively eliminates the longer wavelengths, and how shorter wavelength nonuniformities can be "tuned out" by varying parameters such as the focal position and the radial intensity profile of the beam. The distance required for adequate thermal smoothing of the irradiation nonuniformities is found to be 2 to 3 times smaller than previously estimated due mainly to the relatively small spatial wavelength of the nonuniformities. This is a consequence of the geometrical symmetry of the laser system and is relatively insensitive to the details of overlapping beams. The results are particularly important for irradiation with short wavelength laser light (e.g., 0.35 μm), as the small smoothing distances anticipated for moderate laser intensities are found to produce adequate attenuation of the calculated nonuniformities.

45271 **Stability of relativistic laminar flow equilibria for electrons drifting in crossed fields.** Swegle, J. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Physics of Fluids;* **26**: No. 6, 1670-1677(Jun 1983). Contract AC04-76DP00789.

The stability of the electron flow in magnetically insulated transmission lines and diodes, and in microwave devices is an important issue. Presented in this paper are the results of an electromagnetic, linear stability analysis of transverse magnetic waves propagating along the direction of electron drift in a planar system described by a relativistic laminar flow equilibrium. In general, this equilibrium features cold electrons executing E x B drifts in self-consistently calculated electromagnetic fields. For this paper, a class of laminar flow equilibria in which the relativistic plasma and cyclotron frequencies are multiples of one another was chosen, and the electrons were taken to be confined to a layer placed in a vacuum gap between two conductors. This configuration is driven unstable by two separate mechanisms which tap the free energy associated with the sheared velocity field of the layer. At long wavelengths, the interaction of positive and negative energy surface waves results in the diocotron instability. At shorter wavelengths, the interaction of surface waves and sheets of electrons resonant at the local Doppler-shifted cyclotron frequencies leads to a pair of unstable branches of the dispersion relation which are referred to collectively as the magnetron instability. The scaling of the growth rates with equilibrium parameters and the relative importance of the two instabilities are discussed.

45272 **Two-frame flash x-radiography device for the study of particle beam fusion target implosions.** Fehl, D.L.; Chang, J. (Sandia National Laboratories, Albuquerque, New Mexico 87185). *Review of Scientific Instruments;* **54**: No. 6, 665-672(Jun 1983). Contract AC04-76DP00789.

A two-frame flash x-radiography (FXR) system has been developed for studying the implosion hydrodynamics of particle beam driven, inertial confinement fusion (ICF) targets. This system consists of two micropoint flash x-ray sources, two gated x-ray cameras, and a mechanical framework for aligning these components with respect to the target. The tungsten micropoint sources yield a bremsstrahlung spectrum with an end-point energy of 600 keV, an x-ray dose of 8 mrad at 61 cm, a spot size of ~100 μm, and an exposure time of ~3 ns. A geometric magnification of 4 x was employed in this radiographic arrangement, with an overall system resolving power of 4 line pairs/mm. This system has been used successfully to observe relativistic electron beam (REB) driven, ablative pusher target implosions.

45273 **Scattering of light by laser fusion targets with small defects.** Cooper, D.E.; Wang, D.; Kerker, M. (University of California, Los Alamos National Laboratory, P. O. Box 1663, Los Alamos, New Mexico 87545). *Applied Optics;* **22**: No. 1, 83-94(1 Jan 1983).

The extended boundary condition method was used to determine the effect imperfection in small glass and metal shells have on scattered light at 10.6 μm. The results indicate that imperfections cause a shift in the locations of the minima in the differential scattering curve, a change in the extinction efficiency, and the presence of depolarized components for off-axis orientation of the object. Among these, the presence of and changes in the depolarized component are most sensitive to imperfections. We compute the depolarized scatter from shells with types I, II, and III defects and discuss the potential of light scattering as a characterization tool for laser fusion targets.

45274 **Cryopump operations with the tokamak neutral beam injector prototype.** Byrns, R.A.; Newell, G.A. (Lawrence Berkeley Lab., Univ. of Calif., Berkeley, CA). pp 1145-1152 of Advances in Cyrogenic Engineering, Vol. 27. Fast, R.W. New York, NY; Plenum (1982). (CONF-810835—).

From 1981 cryogenic engineering conference; San Diego, CA, USA (10 Aug 1981).

The study follows previous descriptions of the prototype of the cryosystem. Here a brief description of the process is given and the neutral beam injector with target tank is illustrated. The cryosystem components are listed and a description is given of the heat loads and diverter valve. The helium system schematic is shown. Regeneration, vacuum pumping system and refrigeration, and operations are described. Subsequent recorded discussion concerned the performance of the transfer lines and the closed loop operation.

45275 **Cryogenics for neutral beam testing.** Tasoulias, G.W.; Wright, K.E. (Grumman Aerospace Corp., Bethpage, NY). pp 1153-1162 of Advances in Cyrogenic Engineering, Vol. 27. Fast, R.W. New York, NY; Plenum (1982). (CONF-810835—).

From 1981 cryogenic engineering conference; San Diego, CA, USA (10 Aug 1981).

The refrigeration system of the Neutral Beam Test Cell is described with the helium refrigerator design features specified and Neutral Beam Line illustrated. Refrigeration description includes a schematic of a section of the Tokamak Fusion Test Reactor facility. Refrigeration description is shown in a table. Piping transfer system is presented with primary load parameters itemized. Purification systems and helium storage are discussed. The cell is expected to be versatile, providing independent operation from the larger refrigerator, 3.8 K and 4.5 K temperature levels and flexibility for component testing. Design capability allows hookup to the central computer for automated control. Future plans are outlined.

45276 **Design of pumped neutralizers for neutral beams using Monte Carlo methods.** Conrad, J.R.; Pirkle, D.R. (University of Wisconsin, Madison, WI 53706). *Transactions of the American Nuclear Society;* **43**: 398-399(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45277 **Bayesian parallel processing method for power plant diagnostics.** Upadhyaya, B.R. (University of Tennessee, Knoxville, TN 37916). *Transactions of the American Nuclear Society;* **43**: 383-384(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45278 **Improved iterative method for solution of fully implicit thermal-hydraulics equations.** Gelbard, E.M.; Hofmann, J.R.; Kaganove, J.J. (Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, IL 60439). *Transactions of the American Nuclear Society;* **43**: 384-385(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45279 **Solution of convection-dominated flows.** Chawla, T.C.; Leaf, G.; Minkowycz, W.J. (Argonne National Laboratory, 9700 S. Cass Avenue, Argonne, IL 60439). *Transactions of the American Nuclear Society;* **43**: 385-387(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45280 **A nodal integral method for the numerical solution of incompressible fluid flow problems.** Azmy, Y.Y.; Dorning, J.J. (University of Illinois, Urbana, IL 61801). *Transactions of the American Nuclear Society;* **43**: 387-388(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45281 **A one-dimensional hybrid code for FRM startup.** Stark, R.A.; Miley, G.H. (University of Illinois, Urbana, IL 61801). *Transactions of the American Nuclear Society;* **43**: 390(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45282 **Methodology for Monte Carlo geometrical perturbation analysis with application to a process heat fusion blanket.** Ragheb, M.M.H.; Lazareth, O. (Brookhaven National Laboratory, Upton, NY 11973). *Transactions of the American Nuclear Society;* **43**: 390-393(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

45283 **Vectorized Monte Carlo for nonlinear radiation transport.** Martin, W.R.; Calahan, D.A. (University of Michigan, Ann Arbor, MI 48105). *Transactions of the American Nuclear Society;* **43**: 399-400(1982). (CONF-821103—).

From American Nuclear Society winter meeting; Washington, DC, USA (14 Nov 1982).

99 GENERAL AND MISCELLANEOUS

45284 **(BNL—33010) Program summaries for 1982 - Energy Sciences programs.** (Brookhaven National Lab., Upton, NY (USA)). Sep 1982. Contract AC02-76CH00016. 80p. NTIS, PC A05/MF A01. Order Number DE83014104.

Objectives and some of the accomplishments during 1982 are described for research programs in the divisions of chemical sciences, metallurgy and materials science, and process sciences. Plans for 1983 are described briefly.

9901 Management

REFER ALSO TO CITATION(S) 45289

45285 **(ANAEM-FR—81) Progress report 1981.** (Ankara Nuclear Research and Training Center (Turkey)). 1982. 156p. (In Turkish, English). NTIS (US Sales Only), PC A08/MF A01. Order Number DE83702225.

Presented are the research works carried out in 1981 in Physics, Chemistry, Nuclear Agriculture, Health Physics, Electronics Division and Nuclear Information group of Ankara Nuclear Research and Training Center.

45286 **(CNAEM-R—218) Progress report of Cekmece Nuclear Research and Training Center for 1981.** (Cekmece Nuclear Research Center, Istanbul (Turkey)). 1982. 46p. (In Turkish). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702226.

Presented are the research works carried out in 1981 in Energy, Radiological Safety, Radioisotope, Application of Nuclear Techniques and Basic Research of Cekmece Nuclear Research and Training Center.

45287 **(DOE/OR/00033—T25) Training Kentuckians for industrial jobs: a longitudinal study.** Weseman, M.; Preston-Anderson, A. (Oak Ridge Associated Universities, Inc., TN (USA)). Sep 1982. Contract AC05-76OR00033. 23p. NTIS, PC A02/MF A01. Order Number DE83015196.

This study has assessed the long-term impact of training at TAT on under-employed and unemployed, disadvantaged Kentuckians using such measures as employment stability, wages increases, and type of occupation. Despite the turbulent economy of the past few years, Kentucky TAT graduates have experienced high rates of employment and wages. These findings indicate that completing the TAT program has a positive impact on posttraining employment experiences. The high rate of posttraining employment of graduates contrasts markedly with the unstable, limited employment experiences of the comparison group noncompleters. All subgroups examined experienced favorable outcomes, although women and blacks reported similar employment rates but lower wage rates than whites and males. The most dramatic finding of the study is the increase in wages of graduates over pretraining rates. Current wages of graduates average two and half times pretraining rates. Most of the increase in wages may be reasonably attributed to completion of the program because (1) comparison nongraduates did not experience significant wage increases, and (2) the magnitude of wage gains is too large to be explained by maturation, inflation, and other factors. Stable employment and high wage rates experienced by most graduates demonstrate that training for industrial jobs is an effective strategy for moving the disadvantaged out of low wage, temporary employment and into the primary labor market. The high rate of employment at the time of the survey also suggests that the skills learned at TAT are still in demand despite the current economic slowdown. 6 tables.

9902 Mathematics And Computers

REFER ALSO TO CITATION(S) 43274, 43275, 43790, 43891, 43960, 44444, 44623, 44637, 45057

45288 (CONF-721002—, pp 158-165) **Large computer facilities.** Fletcher, J.G. (Lawrence Livermore National Lab., CA). 1972. NTIS, PC A16/MF A01.

From Interagency conference on the environment; Livermore, CA, USA (17 Oct 1972).

This paper summarizes several aspects of experience and current trends in digital computers including the CDC 7600, the CDC 6600, and plans for a CDC Star-100. Oak Ridge currently uses IBM 360 to 370 series. (PSB)

45289 **(DOE/IG—0195) Commercial timesharing costs at the Federal Energy Regulatory Commission.** (USDOE Office of Inspector General, Washington, DC). 13 Jun 1983. 16p. USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830.

Report to The Secretary.

The purpose of this audit was to review the commercial timesharing costs incurred by the Federal Energy Regulatory Commission (FERC) from Boeing Computer Services (BCS) to determine whether FERC was using these services in the most economic, efficient and effective manner. We were primarily interested in determining whether FERC could realize cost savings through closer monitoring of the use of disk storage capacity or by changing or modifying existing user procedures. The matters discussed in this report are within the overall responsibility of FERC's Office of Program Management with day-to-day operational control exercised by the Director of Energy Data. We analyzed monthly timesharing invoices from BCS for the period October 1981 through March 1982. On May 25 and 26, 1982, we used existing utility computer programs to determine the period of time data remained stored on magnetic disks, and the number of disk tracks FERC users were allocating for unique and general purpose applications. We also reviewed BCS's pricing schedules to estimate potential cost savings. Our examinations were made in accordance with generally accepted government auditing standards. Findings and recommendations are given, and management and auditor comments are included. (WHK)

45290 **(EGG-M—06483) Data Analysis through a Generalized Interactive Computer Animation Method (DATICAM).** Curtis, J.N.; Schweider, D.H. (EG and G Idaho, Inc., Idaho Falls (USA)). 1983. Contract AC07-76ID01570. 9p. (CONF-830620—3). NTIS, PC A02/MF A01. Order Number DE83015442.

From National Computer Graphics Association annual conference; Chicago, IL, USA (26 Jun 1983).

Portions are illegible in microfiche products.

DATICAM is an interactive computer animation method designed to aid in the analysis of nuclear research data. DATICAM was developed at the Idaho National Engineering Laboratory (INEL) by EG and G Idaho, Inc. INEL analysts use DATICAM to produce computer codes that are better able to predict the behavior of nuclear power reactors. In addition to increased code accuracy, DATICAM has saved manpower and computer costs. DATICAM has been generalized to assist in the data analysis of virtually any data-producing dynamic process.

45291 **(IFVE-OI—82-10) Device for information input into a computer.** Golosaj, N.I.; Medved', V.Ya.; Polkanov, V.A.; Serga, E.V.; Shamsuarov, A.D. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702190.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 3 figs.; submitted to the journal Instrum. Exp. Tech.

A describtion of an information input device for control of the object with one or two degrees of freedom made on the basis of track-ball is given. Control signals may change proportionally to the speed or square of speed of the ball rotation. The device consists of the remote console where the track-ball and two photoelectric converters are placed. The console is connected with a signal converter by means of a cable. The signal converter is manufactured in the module of a unit width. The structure of the output codes, control commands and signal levels correspond to standard of the CAMAC system. The track-ball can operate on-line with a computer.

45292 **(IFVE-OMVT—82-9) ATOM graphic package. Curve plotting.** Klimenko, S.V.; Kochin, V.N. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 22p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702213.

7 refs.; 8 figs.

The note describes subroutines for plotting graph which are incorporated into the graphic package "Atom" designed for problems of analysing experimental physics data. A formal interface with user's data which can easily be adjusted to any format of data representation and secures the information content necessary for graph plotting, is described. The paper also describes the means enabling automatization of definition of data variation limits and the parameters of labelling the coordinate axes. The subroutines are implemented in FORTRAN and applied at IHEP at DEC-10 and ILC-1906 computers.

45293 **(IFVE-OMVT—82-71) Atom graphic package. Space object plotting.** Klimenko, S.V.; Kochin, V.N.; Samarin, A.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 31p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702211.

Portions are illegible in microfiche products3 refs.; 7 figs.

This paper describes the subroUtines designed to construct space objects which are incorporated into the "Atom" graphic package. It also describes the means forming the central and parallel projections of surface and histograms, those skew angle ones included, set either analytically or by number arrays with an option to suppress the hidden lines. The paper also describes the facilities of constructing images of wire objects and considers the techniques of increasing the visuality of such images. The subroutines constructing the equal level lines are described to. The subroutines are implemented at DEC-10 and ICL-1906 computers.

45294 **(IFVE-OMVT—82-84) RTFAS automated system for image processing. System journal.** Kaminskij, L.G.; Karlov, G.D.; Klimenko, S.V. (Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij). 1982. 31p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702212.

8 refs.; 2 figs.; 1 tab.

A special subsystem (system journal (ST)) being a part of the RTFAS automated image initial processing system is described. ST provides acquisition and storage of statistical data on system operation, on-line control over the state of projectors and output of peperworks. ST is under operation for more than two years. In this period the relative operator outages have decreased from 40% to 17%. The conclusion is made that the use of ST considerably simplifies the work of system technical personnel and facilitates control over the image processing procedure.

45295 **(JINR—10-82-143) Unified software of the ES-1040 computer for organization of graphic data representation in program packages of the "Disc-2" and "SYsO" real time systems.** Senner, A.E. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702214.

7 refs.

Unified components of real time software for graphic data representation are considered. The developed dialogue means enable an experimenter to control flexibly for image display. The problems of increasing the efficiency of using immediate memory resource and optimization of real time software are discussed. Graphic data organization algorithms used in software of the "Disc-2" and SJO experimental systems are described.

45296 **(JINR—10-82-292) Comparative characteristics of programs for statistical distribu-- tion collection in the HBOOK system.** Ivanchenko, Z.M.; Ivanchenko, I.M.; Karpenko, N.N.; Mojsenz, P.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 6p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702207.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.; 1 fig.; 1 tab.

Comparative analysis of the rates of statistical distribution collection by means of the HFILL and HFF1 programs being a part of the HBOOK package of service programs is made. The computer-independent and ES-oriented versions of the HFF1 program having faster one-dimensional distribution collection are described. The rates of data collection when using these versions are increased by 6 and 10 times correspondingly as compared with the HFILL program. The rate increase is achieved by intermodule realizing the functions of resulting array compression, decreasing the volume of quasidynamic characteristics calculation, taking into account the computer byte structure and optimizing the algorithms of dynamic structure element search. The results obtained give an opportunity to optimize the process of experimental data statistical processing selecting the proper programs and the mode of their operation.

45297 **(JINR—10-82-482) Software structure of computer graphics for on-line physical experiments.** Govorun, N.N.; Ivanchenko, I.M.; Mojsenz, P.V.; Pal'chik, V.V. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702217.

9 refs.

On the basis of analysis of the present state of some problems of computer graphics and on-line experiments a software system is created. It is intended for generating and graphical representation and for operative interaction with these associated processes. The system of graphical representation is used in JINR experiments on the ES computer to output data on displays with storage tubes and TEKRONI 4051 graphical computer system. This software has wide possibilities for solving problems of modern ex-

periment control and data processing, is very simple in utilization, application and adaptation.

45298 **(JINR-R—10-82-105) ACTIV-computer code for automatic processing of γ-ray spectra.** Zlokazov, V.B. (Joint Inst. for Nuclear Research, Dubna (USSR)). 1982. 18p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702218.

Portions are illegible in microfiche products0 refs.; 2 figs.; 2 tabs.; submitted to the journal Comput. Phys. Commun.

The ACTIV computer code is intended to a precise analysis of gamma-ray and X-ray spectra and allows the user carry out the full cycle of the automatic processing of series of spectra, i. e. the calibration, the automatic peak search, the determination of peak positions and areas, the identification of the radioisotopes and the transformation of the areas found into masses of isotopes of an irradiated sample. ACTIV uses a complicated mathematical technique and is oriented mainly to large computers, but using the overlaid loading, it can run also on small computers like PDP-11/70. Compared with other similar computer codes, ACTIV has some advantages in accuracy of the peak shape description and in the reliability of the peak search and its least-square analysis. The program can be used for the purposes of the activation analysis.

45299 **(JINR-R—10-82-217) Operation with files in the mode of sequential access in the system of spectra processing.** Nefed'eva, L.S.; Saltykov, A.I.; Strojkov, V.N. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation). 1982. 5p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702208.

Microfiche only, copy does not permit paper copy reproduction. Original copy available until stock is exhausted refs.

The structure of sequential access files used in the system of spectra processing (SSP) operating at the BESM-66 computer is described. The conclusion is made that the described organization of files sufficiently increases the SSP efficiency and provides additional comfort for a user when creating program modules for data processing.

45300 **(JINR-R—14-82-203) Texture analysis on the base of incomplete pole figures. Mathematical substantiation and the ICPOFI program description.** Fel'dmann, K. (Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics). 1982. 8p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702209.

Paper copy only, copy does not permit microfiche production. Original copy available until stock is exhausted refs.; 6 figs.; 1 tab.

The ICPOFI program for quantitative texture analysis on the base of incomplete pole figures is described. The most important formulae are given. A computer program for determination of series expansion coefficients with respect to spherical harmonics is described. Pole figures from samples with orthorhombic symmetry can be used. The crystal lattice is allowed to have cubic, hexagonal, tetragonal or orthorhombic symmetry. On the base of coefficients the program is able to calculate orientation distribution function, inversed pole figures and recalculated pole figures. The necessary ranges of incomplete pole figures for reflection and transmission cases respectively and for different lattice symmetries are determined.

45301 **(KIYI—81-25) Storage and processing of one-dimensional spectra using the hierarchy computer system.** Golovach, L.A.; Ofengenden, R.G.; Patlan', Yu.V.; Struzhko, V.G. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1981. 25p. (In Russian). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83702222.

An engineering and structure of the computer hierarchy software system are considered. This system is intended for storage and on-line spectrometric data processing. There are given texts of the processing programs and brief description.

45302 **(KIYI—81-26) Graph plotter software connected with computer M-6000 (Basic programs).** Golovach, L.A.; Ofengenden, R.G.; Olejnikov, L.N. (AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij). 1981. 48p. (In Russian). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83702223.

The work deals with a description of software system for graph plotter PDD1, connected with computer M-6000. This system is developed at the Institute for Nuclear Research of the Ukrainian Academy of Sciences. The main attention is payed to description of the user graphic directives and consideration of some general problems, necessary for work with program. Problems of system initiation are also considered, reference is given in appendixes. This work is intended for system users.

45303 **(LA—9698-MS) Los Alamos National Laboratory computer benchmarking 1982.** Martin, J.L. (Los Alamos National Lab., NM (USA)). Jun 1983. Contract W-7405-ENG-36. 27p. NTIS, PC A03/MF A01. Order Number DE83014776.

Evaluating the performance of computing machinery is a continual effort of the Computer Research and Applications Group of the Los Alamos National Laboratory. This report summarizes the results of the group's benchmarking activities performed between October 1981 and September 1982, presenting compilation and execution times as well as megaflop rates for a set of benchmark codes. Tests were performed on the following computers: Cray Research, Inc. (CRI) Cray-1S; Control Data Corporation (CDC) 7600, 6600, Cyber 73, Cyber 825, Cyber 835, Cyber 855, and Cyber 205; Digital Equipment Corporation (DEC) VAX 11/780 and VAX 11/782; and Apollo Computer, Inc., Apollo.

45304 **(LBL—16042) Local networking with intelligent nodes.** Meng, J. (Lawrence Berkeley Lab., CA (USA)). Jun 1983. Contract AC03-76SF00098. 6p. (CONF-8305105—1). NTIS, PC A02/MF A01. Order Number DE83014900.

From International symposium on mini and microcomputers and their applications; San Francisco, CA, USA (16 May 1983).

In order to lengthen the useful life of existing office-oriented data processing equipment, and ultimately to ease transitions to newer devices, it is desirable to istall the capability of connecting the existing equipment to a resource base which, among other things, permits easy movement of data files from older system onto newer ones and which provides an archiving capability independent of any of the user systems. To achieve this economically, we propose a low-grade RS232-based communications network based on a common intelligent node. Node designs, network interconnections and predicted performance are discussed.

45305 **(ORNL/CSD—120) KWIC Index for Numerical Linear Algebra.** Carpenter, J.A. (Oak Ridge National Lab., TN (USA)). Jul 1983. Contract W-7405-ENG-26. 69p. NTIS, PC A04/MF A01. Order Number DE83014889.

This report is a sequel to ORNL/CSD-106 in the ongoing supplements to Professor A.S. Householder's KWIC Index for Numerical Algebra. Beginning with the previous supplement, the subject has been restricted to Numerical Linear Algebra, roughly characterized by the American Mathematical Society's classification sections 15 and 65F but with little coverage of infinite matrices, matrices over fields of characteristics other than zero, operator theory, optimization and those parts of matrix theory primarily combinatorial in nature. Some consideration is given to the uses of graph theory in Numerical Linear Algebra, particularly with respect to algorithms for sparse matrix computations. The period covered by this report is roughly the calendar year 1982 as measured by the appearance of the articles in the American Mathematical Society's Contents of Mathematical Publications lagging actual appearance dates by up to nearly half a year. The review citations are limited to the Mathematical Reviews (MR).

45306 **(PNL-SA—9619) TRAN-STAT: statistics for environmental studies.** Gilbert, R.O.; Kinnison, R.R. (Pacific Northwest Lab., Richland, WA (USA)). May 1981. Contract AC06-76RL01830. 31p. NTIS, PC A03/MF A01. Order Number DE83015095.

The statistical theory for counting extremes is discussed. The statistics of exceedances are nonparametric since the methods require only nominal level data from an underlying continuous distribution. It is assumed the observations are independent and the parameters of the underlying distribution do not change or they change in a known way. (ACR)

45307 **(PNL-SA—10092) TRAN-STAT: statistics for environmental studies, No. 18, January 1982.** Gilbert, R.O.; Kinnison, R.R. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830. 23p. NTIS, PC A02/MF A01. Order Number DE83014000.

The statistical techniques that can be used for extreme value analysis of multivariate data are outlined. All the techniques suggested are derived from multivariate statistical procedures, ranging from classic discriminant analysis to modern cluster analysis algorithms. Also presented is an introduction to the Weibull or Fisher Type 3 Extreme Value distribution. This distribution is used in the study of reliability and in materials failure studies. The density and distribution functions are presented along with formulas for several estimable statistics. The Weibull distribution allows the option of including a third parameter, in addition to scale and shape parameters, which represents a threshold below which the probability of an effect or a measured response is zero. Simple parameter estimators are given, and it is noted that such estimators usually depend upon the logarithmic relationship between the Weibull and Extreme value distributions. The literature on parameter estimation is reviewed and papers are cited that propose unbiased and efficient estimators for parameter values, confidence intervals, and tolerance limits, and that can be used with censored samples. Finally, the use of life testing statistics for extreme value problems is discussed.

45308 **(PNL-SA—10433) TRAN-STAT (statistics for environmental studies) Number 20, May 1982.** Gilbert, R.O.; White, G.C. (Pacific Northwest Lab., Richland, WA (USA)). Jul 1983. Contract AC06-76RL01830;W-7405-ENG-36. 32p. NTIS, PC A03/MF A01. Order Number DE83015096.

Portions are illegible in microfiche products.

An overview is presented, with examples, introducing the statistics and mathematics of modeling with non-linear regression functions. Non-linear regression is becoming important in the prediction of environmental impacts using computer models. (ACR)

45309 **(SAAS—293) Method for unfolding high-energy scintillation gamma-ray spectra up to 8 MeV.** Dymke, N.; Hofmann, B. (Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)). 1982. 24p. (In German). NTIS (US Sales Only), PC A02/MF A01. Order Number DE83701820.

In unfolding a high-energy scintillation gamma-ray spectrum up to 8 MeV with the help of a response matrix, the means of linear algebra fail if the matrix is ill conditioned. In such cases, unfolding could be accomplished by means of a mathematical method based on a priori knowledge of the photon spectrum to be expected. The method which belongs to the class of regularization techniques was tested on in-situ gamma-ray spectra of ^{16}N recorded in a nuclear power plant near the primary circuit, using an 1.5 x 1.5 in. NaI(Tl) scintillation detector. For one regularized unfolding the results were presented in the form of an energy and a dose-rate spectrum.

45310 **(SAND—83-1110) Metacad programmer's guide.** Yarberry, V.R. (Sandia National Labs., Albuquerque, NM (USA)). May 1983. Contract AC04-76DP00789. 76p. NTIS, PC A05/MF A01. Order Number DE83015635.

Metacad is a collection of routines which creates a randomly accessible data structure from Applicon's APPLE-3D data format and supplies a logical method for manipulation of the data structure by a CAD application program.

45311 **(SAND—83-1119) Measuring stiffness.** Shampine, L.F. (Sandia National Labs., Albuquerque, NM (USA)). Jun 1983. Contract AC04-76DP00789. 30p. NTIS, PC A03/MF A01. Order Number DE83014792.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

Many problems have been proposed for the testing and evaluation of mathematical software for the solution of the initial value problem for a system of ordinary differential equations. The stiffness of a given problem is of great significance for testing, but the concept is at best somewhat vague and the few quantitative measures of stiffness being used are of limited value. A relatively precise and quantitative way is proposed to answer the questions: how does the stiffness vary in the course of the integration of a given problem. Is a given problem A stiffer than a given problem B, and if so, by how much.

45312 **(SAND—83-8231) DIFFUSE 83.** Baskes, M.I. (Sandia National Labs., Livermore, CA (USA)). Jun 1983. Contract AC04-76DP00789. 26p. NTIS, PC E02/MF A01. Order Number DE83014935.

Portions are illegible in microfiche products. Original copy available until stock is exhausted; Includes 1 sheet of 48x reduction microfiche.

This document is intended to acquaint the reader with the computer code DIFFUSE which has been revised from the 1980 version. DIFFUSE may be used to calculate the one-dimensional diffusion and trapping of atoms in a material under general initial, source, and boundary conditions. The document includes a description of the physical model, code input and output format, three typical sample problems and their output, and the control cards needed to use DIFFUSE at Sandia National Laboratories, Livermore.

45313 **(SOL—83-5) Combinatorial approach to some sparse-matrix problems.** McCormick, S.T. (Stanford Univ., CA (USA). Dept. of Operations Research). Jun 1983. Contract AT03-76ER72018. 74p. NTIS, PC A04/MF A01. Order Number DE83014641.

Portions are illegible in microfiche products.

It has recently been realized that when the Hessian has a fixed, known sparsity pattern, a considerable reduction in gradient evaluations can often be achieved by a suitable choice of difference directions. This dissertation advances a way of classifying the various methods that have been proposed for choosing difference directions, and shows that finding an optimally small set of directions for any of the four sub-varieties of the Direct Methods is NP-Complete. The complexity results are obtained by showing that finding optimal sets of difference directions is equivalent to related graph coloring problems. The second problem has been shown to be NP-Complete. By adopting a fairly mild non-degeneracy assumption we are able to derive a low-order polynominal algorithm which reduces given constraints into an optimally sparse equivalent set of constraints. This algorithm is based on bipartite matching theory, and it induces a partial order on the rows of the matrix which is related to Dulmage-Mendelsohn decomposition. The proof that the algorithm is correct yields a performance guarantee when the algorithm is applied to real data, and several modifications that improve its running time are discussed. Some computational experience is presented which indicates that the algorithm may be practically useful as a preprocessor for linearly constrained optimization. We also discuss the relationship of this research to finding optimally sparse null-space bases, and to the complexity of matroid oracles.

45314 **(UCID—18852-Rev.1) Syntax and semantics of a LINCS control monologue.** Minton, J.A.; Donnelley, J.E.; Mecozzi, D.T.; Du Bois, P.J. (Lawrence Livermore National Lab., CA (USA)). 24 Jun 1983. Contract W-7405-ENG-48. 34p. NTIS, PC A03/MF A01. Order Number DE83015414.

Portions are illegible in microfiche products. Original copy available until stock is exhausted.

The basic unit of information in a LINCS (Livermore Interactive Network Communication Standard) Control Monologue is a token. A sequence of tokens makes up a statement, a sequence of statements makes up a message, and one or more messages and associated state information make up a control monologue. A monologue is bound to an association. An association is made up of a speaker and a listener, where each is represented as a LINCS port address. The data structure in which the state information is retained is called a Control Monologue Record (CMR). This refer-

ence document defines the syntax and semantics of tokens, statements, messages, control monologues, and CMRs.

45315 **(UCID—19806) CAMDAS (CAMAC data-acquisition system).** Howe, R.E. (Lawrence Livermore National Lab., CA (USA)). 20 May 1983. Contract W-7405-ENG-48. 40p. NTIS, PC A03/MF A01. Order Number DE83014907.

A CAMAC-based data-acquisition system for the LLNL Physics department is described. The system combines the versatility of CAMAC together with the speed of a PDP-11/23 processor and the convenience of FORTRAN programming language. The software permits acquisition in several different modes simultaneously. Acquisition modes include multiscaling, multichannel analysis (PHA), and event-by-event. Step-by-step instructions are supplied for configuring the hardware, booting up the system, understanding the command structure, recovering from errors, and modifying the software. The software is designed not as a sealed system but rather as an operable program which can be enhanced or modified easily by the user.

45316 **(UCID—19821) Additional symbols used in double-spaced text for Wang OIS word-processor users.** Miller, J.A. (Lawrence Livermore National Lab., CA (USA)). Jun 1983. Contract W-7405-ENG-48. 30p. NTIS, PC A03/MF A01. Order Number DE83014908.

This paper illustrates samples of Greek symbols (and other symbols) that are on the Wang daisy printwheel but not in the form that is often required. This technique can be used in place of rubons. It applies to double-spaced formats only, and involves creating new format lines within the text.

45317 **(UCRL—89383) Plotting CV drawings on an electron-beam recorder.** Vickers, D.L. (Lawrence Livermore National Lab., CA (USA)). 21 Jun 1983. Contract W-7405-ENG-48. 11p. (CONF-8309111—2). NTIS, PC A02/MF A01. Order Number DE83014839.

From 5. annual international computervision user conference; Miami Beach, FL, USA (13 Sep 1983).

We have successfully interfaced a new, ultra-high quality film output device to our array of computervision systems. The device, an electron-beam recorder (EBR) made by Image Graphics Incorporated, allows us to archive an engineering drawing directly on 4 x 6-inch film without going first to paper. To our knowledge, this is the first use of an EBR for CADD output. EBR technology of this quality and speed is relatively new and produces extremely good quality drawings. Film, placed inside a vacuum, is exposed directly by a computer-controlled beam of electrons which can draw a line as narrow as .00025-inch. Addressability on the film is an impressive 48K x 64K. EBR-stored graphic arts fonts and symbols give a professional, typeset look to a drawing without the cost of transmitting the high-quality CV fonts.

45318 **(Y/DL—759) Procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of the CPT-8000/8100 word processor.** Reeves, C.A. Jr. (Oak Ridge Y-12 Plant, TN (USA)). 27 Jun 1983. Contract W-7405-ENG-26. 61p. NTIS, PC A04/MF A01. Order Number DE83014538.

A detailed procedure is given for communications between CPT 8000 and 8100 Word Processors and Digital Equipment Corporation PDP-type computers. These include the PDP-10, PDP-11, and VAX-series computers. This procedure is presented both to assist and to give guidelines for such communications, and to aid persons with similar types of equipment, perhaps of other manufacturers, in their endeavors.

45319 **Phase transition in a four-dimensional random walk with application to medical statistics.** Percus, O.E.; Percus, J.K. (Corant Institute of Mathematical Sciences, New York University, 251 Mercer Street, New York, New York 10012). *Journal of Statistical Physics;* **30**: No. 3, 755-783(Mar 1983). Contract AC02-76ER03077.

A random walk in a piecewise homogeneous medium can exhibit a variety of asymptotic behaviors. In particular, it may lodge strictly in one region or divide in probability among several. This will depend upon the parameters describing (1) the walk, (b) the interregion boundary, and (c) the initial location of the walk. We analyze from this point of view a special four-dimensional walk on a integer lattice with two homogeneous regions separated by a hyperplane of codimension 1. The walk represents a continuing sequence of clinical trials of two drugs of unknown success probabilities and the two regions represent the Bayes-derived criterion as to which drug to try next. The demarcation in the parameter space of success probabilities and initial coordinates between one- and two-region asymptotics is mapped out analytically in several special cases and supporting numerical evidence given in the general case.

45320 **Data models and data manipulation languages: complementary semantics and proof theory.** Borgida, A.; Wong, H.K.T. pp 260-271 of Seventh international conference on very large data bases. New York, NY; Institute of Electrical and Electronics Engineers, Inc. (1981). Contract W-7405-ENG-48.

From 7. international conference on very large data bases; Cannes, France (9 Sep 1981).

We present briefly a language which integrates the description of a data model, data manipulation language and integrity constraints into one coherent framework, resembling that proposed by several recent papers in the field of semantic data models. We then give two formal specifications of the semantics of the model and DML: one, based on states the state transitions, intended for database implementors and programmers, and one, based on axioms and partial correctness assertions intended for verifiers who wish to show that the system maintains integrity constraints. Most significantly, we sketch the proof that the deductive theory is sound and relative complete and hence matches and state transition semantics.

9903 Information Handling

REFER ALSO TO CITATION(S) 43355, 44001, 44004, 44364, 44813, 45316

45321 **(CONF-8210120—) Proceedings of the 1982 integrated data users workshop.** Olson, R.J.; Millemann, N.T. (eds.). (Oak Ridge National Lab., TN (USA)). 1982. Contract W-7405-ENG-26. 193p. NTIS, PC A09/MF A01. Order Number DE83014761.

From Intergrated data users workshop; Reston, VA, USA (13 Oct 1982).

Portions are illegible in microfiche products.

In a time of fiscal constraint, it becomes ever more important to develop ways for improving the efficiency of data systems. In extreme cases, data bases can be lost as reentrenchment occurs, both because programs to support the data bases no longer exist and because resources to physically preserve the data are no longer available. In less extreme cases, improved efficiency is still needed to maintain and increase productivity. Creating long-term strategies for coping with this problem is of real interest to both the producers and consumers of data and information. The pervasive and interlinked problems of our society must be addressed using data that can be interrelated among physical, economic, and demographic dimensions. This workshop is intended to document the status of integrated data systems in the present climate and to describe approaches for coping with the challenge of how to do more with less. Two general areas are discussed by speakers with extensive experience in data systems: first, technologically based alternatives for improving efficiency and accessing information; and second, institutional alternatives involving options like the sharing of resources and public/private sector cooperation.

45322 **(OEFZS—4179) Use of 'Direct File Organization' for 'Current Awareness'-Services.** Nevyjel, A. (Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.). Aug 1982. 29p. (In German). (MA—51/82; HB—17/82). NTIS (US Sales Only), PC A03/MF A01. Order Number DE83701837.

A program system for evaluation of bibliographic data is described. The direct file organization needs only small storage devices, but restricts the use of the programs to current awareness services in batch processing procedures. The data of the information systems are transformed by interface programs to an internal standardized format. So the retrieval programs can work independent of the used information system.

CORPORATE AUTHOR INDEX

In the Corporate Index, report literature is indexed using the name of the organization or institution responsible for issuing the report. Headings are provided for all report literature and for published literature for which a corporate approach is especially desirable, e.g., symposium and conference proceedings.

Each entry under a corporate heading gives the document title and the volume and abstract numbers. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes.

DOE Energy Information Data Base: Corporate Author Entries (DOE/TIC-4585) is used in the standardization of corporate entries. DOE/TIC-4585 is available for purchase from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, Virginia 22161.

A

Acos Villares S.A., Sao Caetano do Sul (Brazil)
Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components, 8:43769 (R;BR;In Portuguese)

Aerodyne Research, Inc., Billerica, MA (USA). Center for Chemical and Environmental Physics
Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8:44659 (R;US)

American Boiler Manufacturers Association, Arlington, VA
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8:43224 (R;US)

Amsterdam Univ. (Netherlands)
Indium-111 labelled leucocyte scintigraphy in the diagnosis of inflammatory disease. A clinical study, 8:44769 (R;NL)

Amt der Niederoesterreichischen Landesregierung, Vienna (Austria)
Emission cadastre Lower Austria, 8:44685 (R;AT;In German)
Vehicle-emission cadastre Lower Austria, 8:44686 (R;AT;In German)

Ankara Nuclear Research and Training Center (Turkey)
Progress report 1981, 8:45285 (R;TR;In Turkish, English)

AN Ukrainskoj SSR, Kharkov. Fiziko-Tekhnicheskij Inst.
Automatization of ultrahigh frequency measurement methods of characteristics of pulsed plasma processes on-line with the M-7000 computer, 8:45145 (R;SU;In Russian)
Pair gamma-spectrometer, 8:44326 (R;SU;In Russian)
Plasma equilibrium in a three-turn stellarator with correcting cross field, 8:45252 (R;SU;In Russian)
Radiation damage physics and radiation technology, 8:44280 (R;UA;RU)
Software for data processing from telescope of magnetostriction spark chamber in real time on the M-6000 computer, 8:44611 (R;SU;In Russian)

AN Ukrainskoj SSR, Kiev. Inst. Yadernykh Issledovanij
Graph plotter software connected with computer M-6000 (Basic programs), 8:45302 (R;SU;In Russian)
Intensity losses at H^- ion acceleration in the cyclic accelerators at low and medium energies, 8:44551 (R;SU;In Russian)
Simple current-to-frequency converter, 8:44550 (R;SU;In Russian)
Storage and processing of one-dimensional spectra using the hierarchy computer system, 8:45301 (R;SU;In Russian)

Argonne National Lab., IL (USA)
Development of a local void-defect model which accounts for yield losses caused by flow nonuniformities, 8:43303 (R;US)
Developments in eddy-current computation with eddynet, 8:44440 (R;US)
Economics of extracting blanket tight-sands gas with current and improved technology, 8:43293 (R;US)
Effect of oxygen monolayer coverages on titanium sputtering yields as determined by simultaneous laser fluorescence and auger measurements, 8:45198 (R;US)
Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary, 8:43541 (R;US)
Energy consumption in road transport: data-collection requirements, 8:44088 (R;US)
Energy-price dynamics and US depressions: recent analogies, 8:43986 (R;US)
Environmental implications of solar and biomass energy growth, 8:44049 (R;US)
Formerly utilized MED/AEC sites remedial action progam. Radiological survey of the Albany Metallurgical Research Center, United States Bureau of Mines, Biomass Facility and the Back Forty Area, Albany, Oregon, 8:44697 (R;US)
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8:43899 (R;US)
Identification and condenstion of railway fuel-savings measures and strategies, 8:44089 (R;US)
In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 4. Federal Regions VIII, IX, and X, 8:44658 (R;US)
Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides, 8:43393 (R;US)
Leakage-flow-induced vibration of a tube-in-tube slip joint, 8:43799 (R;US)
Longitudinal phase-space matching between microtrons at 185 MeV, 8:44513 (R;US)
Low-cost peaking capability built into base-load coal-fired power plants, 8:43725 (R;US)
Optimal stabilization policy in a model of elasticity dynamics, 8:43987 (R;US)
Physics of reactor safety. Quarterly report, January-March 1983, 8:43945 (R;US)
Preliminary evaluation of crisis-relocation fallout-shelter options. Volume 2. Detailed analysis, 8:44652 (R;US)
Recent developments in the central worth discrepancy, 8:43817 (R;US)
Relativistic effects in the binding energies of few-body nuclei, 8:44969 (R;US)
Review of leakage-flow-induced vibrations of reactor components, 8:43798 (R;US)
Study of an F center in molten KCl, 8:44358 (R;US)
Survey of eddy-current programs, 8:44441 (R;US)
Utility subroutine package used by Applied Physics Division export codes, 8:43797 (R;US)

Arizona Public Service Co., Phoenix (USA)
Airport solar photovoltaic concentrator, Phase III. Project status report No. ASPCP III-4, 1 February 1983-30 April 1983, 8:43529 (R;US)

Arizona State Univ., Tempe (USA). Coll. of Engineering and Applied Sciences
Electrical performance subgroup standards development. Final report, 8:43505 (R;US)

Arizona Univ., Tucson (USA)
Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8:43830 (R;US)

Arkansas Univ., Fayetteville (USA). Dept. of Chemical Engineering
Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8:43439 (R;US)
Arvin Calspan, Buffalo, NY (USA). Applied Technology Group
Mitigation of biofouling using coatings - year 3. Quarterly progress report No. 3, 8:44726 (R;US)
Associacao Brasileira de Direito Nuclear, Rio de Janeiro
Some considerations on the Tlatelolco Treaty, 8:44024 (R;BR;In Portuguese)
Atomic Energy Control Board, Ottawa, Ontario (Canada)
Radioactive material transport, 8:44374 (R;CA)
Transportation incidents involving Canadian shipments of radioactive material. 1947 - 1978, 8:44375 (R;CA)
Atomic Energy of Canada Ltd., Chalk River, Ontario. Chalk River Nuclear Labs.
AECL programs for new applications for nuclear energy, 8:43832 (R;CA)
Autoradiography of metallic matrices, 8:43338 (R;CA)
Control and instrumentation systems for the 600 MWe CANDU PHW nuclear power plants, 8:43867 (R;CA)
Design of multivariable controller for a 600 MWe CANDU nuclear power plant., 8:43868 (R;CA)
Dynamic simulation of the 2 MWt slowpoke heating reactor, 8:43796 (R;CA)
Zircaloy behaviour in high temperature irradiated water, 8:43793 (R;CA)
Atomic Energy of Canada Ltd., Pinawa, Manitoba. Whiteshell Nuclear Research Establishment
Fuel isolation research for the Canadian Nuclear Fuel Waste Management Program, 8:43337 (R;CA)
Auburn Univ., AL (USA). Dept. of Mechanical Engineering
Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9, 8:43802 (R;US)
Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9, 8:43801 (R;US)
Study of the effects of austenitizing and tempering heat treatments on the alloy HT-9, 8:44135 (R;US)
Austin Research Associates, Inc., TX (USA)
Study of transport mechanisms for energetic-ion heating of INTOR-size tokamaks. Final technical report, 2 June 1982-31 May 1983, 8:45098 (R;US)
Australian Radiation Lab., Melbourne
Annual review of research projects 1981, 8:44835 (R;AT)
Australian Uranium Export Office, Canberra
Government development and export policies, 8:44017 (R;AU)
Avco-Everett Research Lab., Inc., Everett, MA (USA)
Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8:43214 (R;US)
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8:43215 (R;US)
Ayers (Emory) Associates, Inc., New York (USA)
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report, 8:43248 (R;US)

B

Battelle Columbus Labs., OH (USA)
Thermochemical conversion of biomass to ethanol. Final report, 8:43451 (R;US)
Battelle Human Affairs Research Center, Seattle, WA (USA)
Institutional implications of establishing safety goals for nuclear power plants, 8:43940 (R;US)
Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation
Exploratory shaft conceptual design report: Gulf Interior Region salt domes, 8:43369 (R;US)
Exploratory shaft conceptual design report: Paradox Basin, 8:43368 (R;US)
Exploratory shaft conceptual design report: Permian Basin, 8:43370 (R;US)
Bechtel National, Inc., San Francisco, CA (USA)
Immobilizing defense waste at the Savannah River Project, 8:43349 (R;US)
Bendix Corp., Kansas City, MO (USA)
Effect of CTBN composition on the properties of clear and filled epoxy adducts, 8:44450 (R;US)
Vapor-phase soldering techniques. Final report, 8:44371 (R;US)
Bendix Field Engineering Corp., Grand Junction, CO (USA)
System for obtaining high-integrity borehole fluid samples. National Uranium Resource Evaluation, 8:43313 (R;US)
Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations
Investigation of sedimentary, mineralogical, chemical, and color patterns and associations in the Rio de Oro mine, McKinley County, New Mexico. National Uranium Resource Evaluation, 8:43325 (R;US)
Ben-Gurion Univ. of the Negev, Beersheba (Israel)
Microprocessor-based power control data acquisition system, 8:43872 (R;IL;In Hebrew)
Bismarck Junior Coll., ND (USA)
Energy plant process operations Curriculum-Development Project. Final technical report, 8:43283 (R;US)
Bochum Univ. (Germany, F.R.). Abt. Chemie
Investigations for chromatographic separation and determination of the rare earths and auxiliary group elements, 8:44325 (R;DE;In German)
Bochum Univ. (Germany, F.R.). Abt. fuer Bauingenieurwesen
Stability calculations for cylindrical shells and folded systems using the method of finite elements, 8:44392 (R;DE;In German)
Brandeis Univ., Waltham, MA (USA). Dept. of Physics
Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983, 8:44911 (R;US)
Brasilia Univ. (Brazil)
Calculation of two-dimensional thermal transients by the finite element method, 8:44426 (R;BR;In Portuguese)
British Columbia Univ., Vancouver (Canada). TRIUMF Facility
TRIUMF kaon factory, 8:44480 (R;CA)
Brookhaven National Lab., Upton, NY (USA)
Accelerator breeder with uranium, thorium target, 8:43836 (R;US)
Aspects of the finite boson number in the IBA, 8:45028 (R;US)
BNL AGS - a context for kaon factories, 8:44510 (R;US)
Brookhaven solar-heat-pump simulator: technical description and experimental results, 8:43547 (R;US)
Consensus estimation study of nuclear power plant structural loads, 8:43944 (R;US)
Data-acquisition system for the NLO error-propagation exercise, 8:43407 (R;US)
Detectors for CBA, 8:44561 (R;US)
Elastic neutrino-electron scattering: a progress report on Exp734 at Brookhaven, 8:44912 (R;US)
Evaluation of the low-temperature heat-exchanger fouling problem. Phase I report. Literature review and work plan, 8:44061 (R;US)
FBR and RBR particle bed space reactors, 8:43818 (R;US)
Hydrogen combustion characteristics related to reactor accidents, 8:43935 (R;US)
Possible use of synchrotrons as post-acceleration boosters for tandems, 8:44509 (R;US)
Probabilistic methods for identification of significant accident sequences in loop-type LMFBRs, 8:43941 (R;US)
Program summaries for 1982 - Energy Sciences programs, 8:45284 (R;US)
Ring-magnetron ionizer for polarized negative-ion sources, 8:44511 (R;US)
Status of the AGS polarized negative-ion source, 8:44512 (R;US)
Brown Univ., Providence, RI (USA)
Elastic neutrino-electron scattering: a progress report on Exp734 at Brookhaven, 8:44912 (R;US)
Bundesanstalt fuer Materialpruefung, Berlin (Germany, F.R.)
Investigations of glands for valves and slides for gases, 8:43732 (R;DE;In German)
Bundesforschungsanstalt fuer Fischerei, Hamburg (Germany, F.R.). Isotopenlaboratorium
Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors, 8:44747 (R;DE;In German)
Bundesministerium fuer Forschung und Technologie, Bonn (Germany, F.R.)
Development and testing of a submersible motor pump driven by a solar cell generator, 8:43490 (R;DE;In German)
Development of a continuous feeding system for coal dust pressure gasification, 8:43146 (R;DE;In German)

Development, testing and application of simple solar air heaters for agriculture and industry, 8:43546 (R;DE;In German)
Effectiveness of testis cancer screening, 8:44760 (R;DE;In German)
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8:43189 (R;DE;In German)
Flue gas desulphurization in a spray tower with de-coupled recycling of soda ash, 8:43735 (R;DE;In German)
Further development and production of silicon carbide powders for pressureless sintering, 8:44241 (R;DE;In German)
Investigation of stress of man caused by work and climate in salt mining, 8:43400 (R;DE;In German)
Large-scale thermal storage systems, 8:43971 (R;DE;In German)
Mass spectrometric analysis of silicon for solar cells, 8:44323 (R;DE;In German)
Methane drainage from coal seams by surface drillings, 8:43188 (R;DE;In German)
Minimizing the energy consumption of industrial furnaces during the heating process by controlling the furnaces using reliable mathematical models and by optimizing necessary cooled supports, 8:44092 (R;DE;In German)
Objective acoustic quality inspection of complex machines, 8:44120 (R;DE;In German)
Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8:43247 (R;DE;In German)
Planning, construction and operation of the 6 MWsub(th)-test facility Koenig Ludwig for firing bituminous coal in an atmospheric fluidized bed furnace, 8:43257 (R;DE;In German)
Project study of prototype plant for the VEW-coal-conversion-process (pressure operation), 8:43147 (R;DE;In German)
Seminar and status report 'wind energy', 8:43671 (R;DE;In German)
Solar thermal power plant 30/50 kWsub(e), 8:43533 (R;DE;In German)
Systematic studies on coals of different deposits, including their mineral matter, 8:43190 (R;DE;In German)
Wind energy converter with high-speed vertical axis rotor and straight rotor blades, 8:43680 (R;DE;In German)

Bundesministerium fuer Wirtschaft, Bonn (Germany, F.R.)
Data concerning the development of the energy economy of the Federal Republic of Germany in 1981, 8:43983 (R;DE;In German)

Bundesstelle fuer Aussenhandelsinformation, Koeln (Germany, F.R.)
Benin - energy situation 1981, 8:43982 (R;DE;In German)

C

Cable Technology Labs., Inc., New Brunswick, NJ (USA)
Determination of threshold and maximum operating electric stresses for selected high voltage insulations. Task II. Investigation of oil-filled paper insulated cables. Progress report No. 3. CTL-83-016, 8:44451 (R;US)

California Univ., Davis (USA)
University of California participation in the CIRP round robin of residual-stress measurement, 8:44443 (R;US)

California Univ., Los Angeles (USA). Inst. of Geophysics and Planetary Physics
High-pressure equation of state of Li, Na, and K, 8:44199 (R;US)

California Univ., Los Angeles (USA). School of Engineering and Applied Science
Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983, 8:44133 (R;US)
Semiconductor eutectics for energy conversion. Final report, 8:43511 (R;US)

California Univ., San Diego, La Jolla (USA). Inst. of Pure and Applied Physical Sciences
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8:44242 (R;US)

Carlson and Sweatt - Monenco, Inc., New York (USA)
State of New York peat-resource inventory. Volume II, 8:43246 (R;US)

Carnegie-Mellon Univ., Pittsburgh, PA (USA)
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8:43163 (R;US)

Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Chemistry
Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983, 8:44356 (R;US)

Case Western Reserve Univ., Cleveland, OH (USA). Dept. of Radiology
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8:44359 (R;US)

Case Western Reserve Univ., Cleveland, OH (USA). Div. of Radiation Biology
Radiation-induced mutagenicity and lethality in Salmonella typhimurium, 8:44787 (R;US)

CEA Centre d'Etudes de Bruyeres-le-Chatel, 92 - Montrouge (France)
Accelerating field spectrometer for photons and electrons simultaneous measurement. Application to decay schemes study, 8:44564 (R;FR;In French)
Experimental measurement of the photon efficiency of a 4 mm thick NE 102 A scintillator for 14 MeV neutrons, 8:44566 (R;FR;In French)

CEA Centre d'Etudes de Limeil, 94 - Villeneuve-Saint-Georges (France)
X ray emission experiments at 1.06 μm and 0.35 μm, 8:44836 (R;FR)

CEA Centre d'Etudes Nucleaires de Cadarache, 13 - Saint-Paul-lez-Durance (France)
Fabrication of plutonium fuel for fast neutron reactors, 8:43800 (R;FR;In French)
Project "REMAD", Neutron spectrometry. Code "SOHO - phase II". First part "FORMULATION", 8:44565 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France)
Determination of seismic reference motions on nuclear sites in France, 8:43875 (R;FR;In French)
High speed motion-picture photography. Instrumentation and application, 8:44629 (R;FR;In French)
Iodine determination in a PWR reactor during normal operation, 8:43874 (R;FR;In French)
Optical fibers and their instrumentation applications, 8:44630 (R;FR;In French)
Safety of storage facilities for LMFBR spent fuels, 8:43342 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Inst. de Protection et de Surete Nucleaire
Annual progress report 1981, 8:43404 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Fontenay-aux-Roses, 92 (France). Section d'Etude de la Corrosion Aqueuse
Intergranular attack of Alloy 600: high-temperature electrochemical tests. Final report, 8:44137 (R;FR)

CEA Centre d'Etudes Nucleaires de Grenoble, 38 (France)
Corrosion and the corrosion inhibition effects in the BUGEY 1 reactor, 8:43789 (R;FR;In French)
Decay heat calculations with the CEA radioactivity data bank and the code PEPIN, 8:43837 (R;FR;In French)

CEA Centre d'Etudes Nucleaires de Saclay, 91 - Gif-sur-Yvette (France)
100 kW Solar Thermal Electric Experimental Plant, 8:43534 (R;FR)
Beryllium health hazards, 8:44805 (R;FR;In French)
Bragg crystal spectrometer for the soft X-ray diffuse background, 8:44563 (R;FR)
Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine, 8:44761 (R;FR)
Chloride permeability of large unilamellar lipidic vesicles, 8:44757 (R;FR)
Decay heat calculations with the CEA radioactivity data bank and the code PEPIN, 8:43837 (R;FR;In French)
Development of a system for the measurement of contamination by plutonium: captor and RC signal post for plutonium and other transuranium elements aerosols, 8:44562 (R;FR;In French)
Finite element method for an ultra compressible flow, 8:43853 (R;FR)
Immersed multipurpose device for the inspection of PWR spent pencils in a loop reloaded in the Osiris pool, 8:43883 (R;FR;In French)
Implementation of a pressurized water reactor simulator for teaching on a mini-computer, 8:43761 (R;FR;In French)

In vivo study of the dopaminergic receptors in the brain of man using ^{11}C-pimozide and positron emission tomography, 8:44763 (R;FR)
In-service inspection of reactors, 8:43763 (R;FR;In French)
Irradiation in the CAP reactor of FRAGEMA fuel assemblies under power transients representative of super imposed load follow and remote control regimes, 8:43762 (R;FR)
ISABELLE-4 loop: a PWR testing loop loaded and unloaded in the pool of the Osiris reactor, 8:43884 (R;FR;In French)
Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine, 8:44765 (R;FR;In French)
Local cerebral blood flow (1CBF) and oxygen consumption (1CMRO$_2$) in evolving irreversible ischemic infarction: a study with positron tomography and oxygen-15, 8:44762 (R;FR)
Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man, 8:44764 (R;FR)
New steady state medium flux neutron source, 8:43885 (R;FR)
Pattern recognition method for nuclear reactor core surveillance, 8:43759 (R;FR;In French)
PICOLO 2 simulator. Programming and application to teaching, 8:43760 (R;FR;In French)
Scattering anisotropy and neutron leakage in a reactor lattice, 8:43838 (R;FR;In French)
TRIPOLI.2. A 3D Monte Carlo system for thermal reactor applications, 8:43758 (R;FR)

CEA Etablissement de la Vallee du Rhone, 30 - Bagnols-sur-Ceze (France)
Actual point about fission products vitrification, 8:43341 (R;FR;In French)

Cekmece Nuclear Research Center, Istanbul (Turkey)
Progress report of Cekmece Nuclear Research and Training Center for 1981, 8:45286 (R;TR;In Turkish)

Centaur Associates, Inc., Washington, DC (USA)
Evaluation of the home-energy-rating concept and the Massachusetts Pilot Project, 8:44086 (R;US)

Centre Scientifique et Technique de la Construction, Brussels (Belgium)
Main characteristics of housing permitting reduced energy consumption for heating. Final report, 8:44079 (R;XE)

Centro Brasileiro de Pesquisas Fisicas, Rio de Janeiro
Economical and strategical aspects of Brazilian-Germany nuclear agreement, 8:44016 (R;BR;In Portuguese)

Centro de Desenvolvimento da Tecnologia Nuclear, Belo Horizonte (Brazil)
KFA/NUCLEBRAS R + D program on Th utilization in PWR, 8:43831 (R;BR)

Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. de Atividades Espaciais
Implementation, of the superfish computer code in the CYBER computer system of IEAV (Instituto de Estudos Avancados) in Brazil, 8:44469 (R;BR;In Portuguese)
Transfer coefficients for turbulent flow between parallel plates, 8:44425 (R;BR;In Portuguese)
UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems, 8:45057 (TG;US)

Centro Tecnico Aeroespacial, Sao Jose dos Campos (Brazil). Inst. Tecnologico de Aeronautica
Transfer coefficients for plate fin and elliptical tube heat exchangers, 8:44412 (R;BR)

Ceskoslovenska Akademie Ved, Prague. Ustav Fyziky Plazmatu
Interaction of an electromagnetic wave with an inhomogeneous plasma slab, 8:45113 (R;CS)
11th Czechoslovak seminar on plasma physics and technology, 8:45249 (R;CS)

Chalmers Tekniska Hoegskola, Goeteborg (Sweden). Institutionen foer Energiteknik
Measurements of heat radiation in a fluidized bed combustor, 8:43261 (R;SE;In Swedish)

Chem Systems, Inc., New York (USA)
Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes, 8:43453 (R;US)

Chillcast, Inc., Marion, OH (USA)
Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8:44134 (R;US)

Cincinnati Univ., OH (USA)
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8:43746 (R;US)

Colorado School of Mines, Golden (USA)
Determination of the state of stress at the Stripa Mine, Sweden, 8:43363 (R;US)

Colorado School of Mines, Golden (USA). Research Inst.
Incinerated waste consolidation studies, 8:43350 (R;US)

Colorado State Univ., Fort Collins (USA). Dept. of Physics
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8:43277 (R;US)

Columbia Univ., New York (USA). Dept. of Chemistry
Utilization of magnetic effects as a means of isotope enrichment. Annual technical progress report, July 1, 1982-June 30, 1983, 8:44348 (R;US)

Columbia Univ., New York (USA). Dept. of Civil Engineering and Engineering Mechanics
First-excursion problems for Gaussian vector processes, 8:43943 (R;US)

Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory
Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface, 8:44742 (R;US)

Combustion Engineering, Inc., Windsor, CT (USA)
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8:43162 (R;US)

Combustion Power Co., Inc., Menlo Park, CA (USA)
Granular-bed-filter development program, Phase II. Final report, 8:43212 (R;US)

Comissao Nacional de Energia Nuclear de Brasil, Rio de Janeiro
2. national meeting of reactor physics, 8:43843 (R;BR;In Portuguese)
Applications of alternating direction methods to the solution of the heat conduction equation, with source, and in transient state, 8:44427 (R;BR;In Portuguese)
New model for simulation of pressurizers in PWR type reactors, 8:43773 (R;BR;In Portuguese)

Comite Francais d'Electrothermice, Paris
IV 5: all-electric drying of textile cloths, 8:44106 (TG;GB)

Commission of the European Communities, Brussels (Belgium)
Frosting and defrosting behaviour of outdoor coils of air-source heat pumps. Final report, figures, 8:44078 (R;XE)

Commission of the European Communities, Luxembourg
Evaluation of research and development. Methods for evaluating the results of European Community R + D programmes, 8:44011 (R;XE;In French)

Computer Sciences Corp., Falls Church, VA (USA)
Hierarchial power control center analyzer. Volume 4. Appendixes and bibliography. Final report, 8:44042 (R;US)

Cornell Univ., Ithaca, NY (USA)
Direct determination of a radiation-damage profile with atomic resolution in ion-irradiated platinum. MSC report No. 5030, 8:44131 (R;US)
Quantitative compositional analysis and field-evaporation behavior of ordered Ni_4Mo on an atomic plane-by-plane basis: an atom-probe field-ion microscope study. MSC report No. 4802, 8:44130 (R;US)

Cornell Univ., Ithaca, NY (USA). Materials Science Center
Atomic-resolution study of homogeneous radiation-induced precipitation in a neutron-irradiated W-10 at. % Re alloy. MSC report No. 5014, 8:44129 (R;US)

CSR Ltd., Sydney (Australia)
Lake Way uranium deposit, 8:43307 (R;AU)

Curtiss-Wright Corp., Wood-Ridge, NJ (USA). Power Systems Div.
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8:44461 (R;US)

D

Danmarks Geologiske Undersoegelse, Copenhagen
Brown-coal reserves of Denmark. Report of phase 1, 8:43245 (R;DK;In Danish)

Danmarks Tekniske Hojskole, Lyngby. Lab. for Energiteknik
Notes in turbomachinery. Pt. 3. Basic relationships, 8:44467 (R;DK)
Notes in turbomachinery. Pt. 1. Design examples, 8:44465 (R;DK)
Notes in turbomachinery. Pt. 2. Experimental and theoretical methods, 8:44466 (R;DK)

Decision Analysis Corp., Annandale, VA (USA)
Analysis of alternative fuel price trajectories. Appendix B. Results of analysis of MFBI data using natural logarithms, 8:43262 (R;US)

Delhi International Oil Div. of CSR, Adelaide (Australia)
Lake Way uranium project, 8:43308 (R;AU)

Department of Energy, Mines and Resources, Ottawa, Ontario (Canada)
Nuclear policy review background papers, 8:44018 (R;CA)

Department of Energy, New York (USA). Environmental Measurements Lab.
Worldwide deposition of ^{90}Sr through 1981, 8:44716 (R;US)

Department of Energy, Pittsburgh, PA (USA). Pittsburgh Energy Technology Center
Quarterly technical progress report, January 1-March 31, 1983, 8:43178 (R;US)

Department of Energy, Washington, DC (USA)
Gyrotron user/developer meeting, 8:45200 (R;US)

Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Koeln (Germany, F.R.)
Stresses and deformations in laminated test specimens of carbon fiber reinforced composites, 8:44257 (R;DE)

Deutsches Elektronen-Synchrotron (DESY), Hamburg (Germany, F.R.)
Differential 3-Jet cross section in e^+e^--annihilation and comparison with 2sup(nd)-order predictions of QCD and Abelian vector theory, 8:44916 (R;DE)
Experimental evidence for differences in <pperpendicular to> between quark jets and gluon jets, 8:44917 (R;DE)
Investigation of two photon final states in e^+e^- annihilation at $\langle\sqrt{s}\rangle$ = 34.2 GeV, 8:44919 (R;DE)
Measurement of charge properties of quark jets at PETRA, 8:44915 (R;DE)
Search for new heavy leptons at PETRA, 8:44918 (R;DE)
Substance ionization by a superheavy monopole, 8:45054 (TG;DE)

Deutsche Shell A.G., Hamburg (Germany, F.R.). Abt. Information und Presse
Aviation fuels - today and tomorrow, 8:44091 (R;DE;In German)

Dow Chemical Co., Midland, MI (USA). Hydrocarbons and Energy Research Dept.
Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977, 8:43304 (R;US)

Drexel Univ., Philadelphia, PA (USA). Environmental Studies Inst.
General approach to assure compliance with ALARA guidelines on direct radiation from a nuclear power plant, January 1979-January 1982, 8:43936 (R;US)

Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.
Tritiated-water detection with a $^2D(\gamma,n)^1H$ monitor, 8:44569 (R;US)

Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant
Beta dosimetry at a nuclear fuel separation facility, 8:44789 (R;US)
Immobilizing defense waste at the Savannah River Project, 8:43349 (R;US)

Dynamic Plastics, Inc., New Paris, OH (USA)
Water storage tube system. Phase 2. Final project report, 8:43639 (R;US)

E

Ecole Polytechnique, Montreal, Quebec (Canada)
Free convection between horizontal cylinders in water at low temperature, 8:44423 (R;BR)
Thermal response of a mass of fluid to a constant cooling rate applied on its boundaries, 8:44413 (R;BR)

Edlow International Co., Washington, DC (USA)
Logistics of Australian uranium in the world market, 8:43332 (R;DE)

EG and G Idaho, Inc., Idaho Falls (USA)
Automated NDT techniques in radioactive waste management, 8:43353 (R;US)
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981, 8:43873 (R;US)
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a, 8:43906 (R;US)
Computer-based regulating control system for the Advanced Test Reactor, 8:43870 (R;US)
Data Analysis through a Generalized Interactive Computer Animation Method (DATICAM), 8:45290 (R;US)
Dynamic qualification of safety-related equipment, 8:43902 (R;US)
Estimation of bias shifts in a steam-generator water-level controller, 8:43869 (R;US)
Experimental damping data for dynamic analysis of nuclear power plant piping systems, 8:43904 (R;US)
Experimental investigation of muon-catalyzed fusion in high-density deuterium-tritium mixtures, 8:45215 (R;US)
Fault trees and the impact of human variability on probabilistic risk analysis, 8:43901 (R;US)
Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup, 8:43747 (R;US)
Industrial-waste-management information for 1982 and record-to-date, 8:44707 (R;US)
Kalman filter-based gap conductance modeling, 8:43748 (R;US)
LOFT uncertainty-analysis methodology, 8:43886 (R;US)
Managerial attitude toward quality assurance, 8:43744 (R;US)
Nuclear power plant piping damping parametric effects, 8:43907 (R;US)
Overview of the PBF Severe-Fuel-Damage Program and results of the first test, 8:43903 (R;US)
PWR small-break analysis using a PDP-11/AD10 computer system, 8:43900 (R;US)
Qualification of automated techniques for meeting ASME code and NRC requirements, 8:43820 (R;US)
Raft River binary-cycle geothermal pilot power plant final report, 8:43662 (R;US)
Reactor-building-basement radionuclide and source distribution studies. Volume 3, 8:43910 (R;US)
Regional compacting for low-level waste management: an innovative approach in national problem solving, 8:43351 (R;US)
Research needs for the use of polymer coatings for corrosion protection, 8:44136 (R;US)
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8:43355 (R;US)
Thermal cycling and vibration response for PREPP concrete waste forms, 8:43354 (R;US)
Use of the modal superposition technique for piping system blowdown analyses, 8:43905 (R;US)

Ehrenkrantz Group, New York (USA)
Building energy performance standards. Phase III. Selection of the reference building set, 8:44073 (R;US)
Building energy performance standards, Phase III. Reference building set to be used as a vehicle for testing energy-code equivalency. Preliminary draft, 8:44069 (R;US)

Eidgenoessisches Inst. fuer Reaktorforschung, Wuerenlingen (Switzerland)
Data base for a site-specific analysis of the dispersion of radioactive elements from a final repository, 8:43399 (TG;US)
Swiss Federal Institute for Reactor Research. 1981 annual report, 8:43834 (R;CH;GE)

Electric Power Research Inst., Palo Alto, CA (USA)
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8:43899 (R;US)

Energietechnik G.m.b.H., Essen (Germany, F.R.). Studiengesellschaft fuer Energieumwandlung, -Fortleitung und -Anwendung
Rational energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Pt. F, 8:44101 (R;DE;In German)
Energiforskningsnaemnden, Stockholm (Sweden)
Future energy landscape. Geographic image of the energy bill of 1981, 8:44029 (R;SE;In Swedish)
Energotechnology Corp., Cambridge, MA (USA)
Low-cost peaking capability built into base-load coal-fired power plants, 8:43725 (R;US)
Energy Research Corp., Danbury, CT (USA)
High-temperature molten-carbonate fuel cells. Technical progress report, January-March 1978, 8:44055 (R;US)
Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.
Community-monitoring program surrounding the Nevada Test Site: one year of experience, 8:44696 (R;US)
Environmental Protection Agency, Research Triangle Park, NC (USA). Office of Air Quality Planning and Standards
Inorganic-arsenic emissions from glass-manufacturing plants: background information for proposed standards, 8:44755 (R;US)
Erevanskij Fizicheskij Inst. (USSR)
Modulation instability in a plasma-electron beam system, 8:45104 (R;SU)
Erlangen-Nuernberg Univ., Erlangen (Germany, F.R.). Fachbereich Ingenieurwissenschaften
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8:44368 (R;DE;In German)
ERTEC, Inc., Long Beach, CA (USA)
Preliminary overburden characterization at Richton Dome, 8:43373 (R;US)
Ertec Western, Inc., Long Beach, CA (USA)
Data reference and retrieval system for Richton Dome, Mississippi: annual status report for fiscal year 1982, 8:44813 (R;US)
European Organization for Nuclear Research, Geneva (Switzerland)
Beauty experiments at the SPS, 8:44914 (R;CH)
Multiparticle hadronic systems produced in high-energy (pp) interactions, and comparison with (e^+e^-), 8:44913 (R;CH)
Exfluor Research Corp., Austin, TX (USA)
New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report, 8:43664 (R;US)

F

Fachinformationszentrum Energie, Physik, Mathematik G.m.b.H., Bonn (Germany, F.R.). Buero Bonn
Briefing package: Solar energy for hot water preparation and space heating. Pt. 2, 8:43643 (R;DE;In German)
Solar energy for hot water preparation and space heating. Pt. 1, 8:43642 (R;DE;In German)
Fermi National Accelerator Lab., Batavia, IL (USA)
Survey of nu/sub μ/e physics with emphasis on recent Fermilab results, 8:44921 (R;US)
Flinders Univ. of South Australia, Bedford Park. Inst. for Atomic Studies
Valence electron momentum distributions in cadmium, 8:44839 (R;AU)
Florida Univ., Gainesville (USA)
Nuclear-fuel-cycle education: Module 10. Environmental consideration, 8:43394 (R;US)
Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8:43329 (R;US)
Flow Industries, Inc., Kent, WA (USA)
Hot-gas cleanup system model development: status report, 8:43216 (R;US)
Foersvarets Forskningsanstalt, Stockholm (Sweden)
Common data base experiment: revised event bulletin, 8:44653 (R;SE)
Ford Motor Co., Dearborn, MI (USA). Research Staff
Ford/ERDA sodium-sulfur battery development. Phase II. Progress report No. 24, September 1-30, 1977, 8:43978 (R;US)
Forschungsgesellsakchaft fuer das Strassenwesen e.V., Koeln (Germany, F.R.)
Road and environment, 8:44754 (R;DE;In German)
Forschungsinstitut fuer Energie- und Umweltplanung, Vienna (Austria)
Emission cadastre Lower Austria, 8:44685 (R;AT;In German)
Vehicle-emission cadastre Lower Austria, 8:44686 (R;AT;In German)
Framatome, 92 - Paris La Defense (France)
Intergranular attack of Alloy 600: high-temperature electrochemical tests. Final report, 8:44137 (R;FR)
Fraunhofer-Gesellschaft zur Foerderung der Angewandten Forschung e.V., Karlsruhe (Germany, F.R.). Inst. fuer Systemtechnik und Innovationsforschung
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors, 8:44025 (R;DE;In German)
FURNAS, Rio de Janeiro (Brazil)
Nuclear power plants. Legal aspects - installation - construction - operation, 8:44023 (R;BR;In Portuguese)
Semi-analytical study of the vibrations induced by flow in the piping of nuclear power plants, 8:43774 (R;BR;In Portuguese)

G

GA Technologies, Inc., San Diego, CA (USA)
Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8:43909 (R;US)
SP-100 coated-particle fuel development. Phase I. Final report, 8:43819 (R;US)
General Electric Co., San Jose, CA (USA). Nuclear Engineering Div.
VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8:43745 (R;US)
General Electric Co., Schenectady, NY (USA)
Near-term electric test vehicle. Phase II. Final report, 8:44124 (R;US)
Near-term electric test vehicle. Phase II. Final report, 8:44125 (R;US)
General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8:43165 (R;US)
Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process. Quarterly report, 29 June 1981-27 September 1981, 8:43166 (R;US)
General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.
60-MW/sub t/ methanation plant design for HTGR process heat, 8:43833 (R;US)
Geological Survey, Denver, CO (USA)
Deep-drilling data, Raft River geothermal area, Idaho: Raft River geothermal production well No. 4, 8:43658 (R;US)
George Mason Univ., Fairfax, VA (USA). Dept. of Economics
Optimal stabilization policy in a model of elasticity dynamics, 8:43987 (R;US)
Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics
Ripple-reduction poloidal-field coils for tokamak reactors, 8:45218 (R;US)
Tokamak ETR objectives, characteristics, and critical issues, 8:45219 (R;US)
Gershman, Brickner and Bratton, Inc., Washington, DC (USA)
Evaluation of potential for electrical generation using solid waste as fuel in the Pacific Northwest, 8:44108 (R;US)
Gesellschaft fuer Reaktorsicherheit m.b.H. (GRS), Koeln (Germany, F.R.)
Analytical investigation concerning condensation of steam with low air content, 8:43967 (TG;US)

Gesellschaft fuer Schwerionenforschung m.b.H., Darmstadt (Germany, F.R.)
Proceedings of the symposium on accelerator aspects of heavy ion fusion, 8:44468 (R;DE)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Bereich Projekttraegerschaften
Influence of enhanced UV-B irradiation on the growth and composition of plants, 8:44790 (R;DE;In German)
Gesellschaft fuer Strahlen- und Umweltforschung m.b.H. Muenchen, Neuherberg (Germany, F.R.). Inst. fuer Angewandte Physik
Range distributions of low-energetic light ions in silicon, 8:45040 (R;DE;In German)
Ghent Rijksuniversiteit (Belgium). Institnut voor Kernwetenschappen
Effective Skyrme-type interaction for the calculation of nuclear structures of the whole mass table, 8:45029 (R;BE;In Dutch)
GKSS-Forschungszentrum Geesthacht G.m.b.H., Geesthacht-Tesperhude (Germany, F.R.)
Fatigue crack growth from blunt notches, 8:44442 (R;DE)
Investigation on the dependence of RPV steel embrittlement on irradiation temperature and neutron exposure, 8:44138 (R;DE)
Goettingen Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet
Influence of hyperthermia on the biological effects of low LET-radiation with different energy spectra, 8:44794 (R;DE;In German)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow
Electrophysical apparatus. Issue 18. Collection of articles, 8:45233 (R;SU;RU)
Eletrophysical apparatus. Issue 19. Collection of articles, 8:45236 (R;SU;RU)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Atomnoj Ehnergii
Electromagnetic processes in a resonance invertor of a feedback system, 8:45222 (R;SU;In Russian)
Energy losses when three-step current switching from an inductive storage into a coil with a liner, 8:45221 (R;SU;In Russian)
Experimental study on flute oscillations in an open trap with magnetic field minimum, 8:45106 (R;SU;In Russian)
First experiments on the TO-2 tokamak with a divertor, 8:45224 (R;SU;In Russian)
Preparation of the constant library in the NEKTAR-M program using the files of evaluated neutron data, 8:43790 (R;SU;In Russian)
Program for numerical calculation of the plasma parameters in a tokamak reactor with fast atom beam injection, 8:45105 (R;SU;In Russian)
Study on training and mechanical degradation in superconducting magnet models, 8:44377 (R;SU;In Russian)
Technique and the DAR and FINDIF codes for one-dimensional calculation of reactor cells with opportunity of account for discontinuous boundary conditions, 8:43841 (R;SU;In Russian)
Toroidal magnet for a tokamak with a strong magnetic field and combined adiabatic compression of the plasma filament, 8:45223 (R;SU;In Russian)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Moscow. Inst. Teoreticheskoj i Ehksperimental'noj Fiziki
Installation for measuring angular correlation of two-photon annihilation of positrons in a condensed medium, 8:44576 (R;SU;In Russian)
Laser for holographic track detection in a bubble chamber, 8:44577 (R;SU;In Russian)
Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber, 8:44578 (R;SU;In Russian)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Obninsk. Fiziko-Ehnergeticheskij Inst.
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8:43908 (R;SU;In Russian)
Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing, 8:43803 (R;SU;In Russian)
Developing the algorithm and code for calculating an interchannel stability of steam generating channels, 8:43854 (R;SU;In Russian)
Energy yield calculation constant preparation in the ARAMAKO system, 8:43840 (R;SU;In Russian)
Ensuring by multigroup constants for calculations of photoneutron sources, 8:45002 (R;SU;In Russian)
Entrainment effect on burnout in disperced-annular flow (on the base of numerical experiment results), 8:43863 (R;SU;In Russian)
EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms, 8:43766 (R;SU;In Russian)
Program for computation of transition processes in the tube bundle of a steam generator module (DINAMO-2), 8:43765 (R;SU;In Russian)
Void fraction and temperature in subcooled liquid flow in an annular channel, 8:43862 (R;SU;In Russian)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Serpukhov. Inst. Fiziki Vysokikh Ehnergij
Analysis of factors effecting superconducting dipole field homogeneity, 8:44493 (R;SU;In Russian)
Analysis of the data recorded from the intermediate gamma detector of the European hybrid spectrometer on the base of the statistical model of an electromagnetic shower, 8:44572 (R;SU;In Russian)
ATOM graphic package. Curve plotting, 8:45292 (R;SU;In Russian)
Atom graphic package. Space object plotting, 8:45293 (R;SU;In Russian)
Device for information input into a computer, 8:45291 (R;SU;In Russian)
Investigation of polyethylene detector and adiabatic calorimeter in the radiation fields of proton accelerators, 8:44573 (R;SU;In Russian)
Measurement of proton beam intensity and efficiency at slow extraction, 8:44534 (R;SU;In Russian)
RTFAS automated system for image processing. System journal, 8:45294 (R;SU;In Russian)
Some characteristics of the CCD-321 instruments with charge connection, 8:44632 (R;SU;In Russian)
Special program-controlled processor of the MELAS system and its software, 8:44570 (R;SU;In Russian)
Study on the characteristics of lead-glass γ-spectrometer radiators irradiated by high energy particles, 8:44625 (R;SU;In Russian)
Study on the coordinate precision of hodoscope hadron calorimeter at energies up to 300 GeV, 8:44571 (R;SU;In Russian)
Technique and computer code for calculating the isotope composition change in one-dimensional homogeneous reactor, 8:43839 (R;SU;In Russian)
Gosudarstvennyj Komitet po Ispol'zovaniyu Atomnoj Ehnergii SSSR, Sukhumi. Fiziko-Tekhnicheskij Inst.
Electron thermal conduction in a tokamak when Joule heating, 8:45155 (R;SU;In Russian)
Grumman Aerospace Corp., Princeton, NJ (USA)
Monte Carlo studies of tandem-mirror plasmas interacting with waves in the ion-cyclotron range of frequencies (ICRF). Progress report, April 1, 1983-June 30, 1983, 8:45099 (R;US)
GTE Labs., Inc., Waltham, MA (USA)
Development of materials for a luminescent solar collector. Final report, September 1, 1979-December 31, 1982, 8:43646 (R;US)
Gulf Oil Exploration and Production Co., Oklahoma City, OK (USA)
Little Knife Field CO_2 minitest, Billings County, North Dakota. Final report. Volume 1. Technical report, 8:43271 (R;US)
Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report, 8:43272 (R;US)
Gulf Research and Development Co., Pittsburgh, PA (USA)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8:43176 (R;US)
Fuel quality/processing study. Volume I. Overview and results, 8:43174 (R;US)
Fuel quality/processing study. Volume II. Literature survey, 8:43175 (R;US)
Fuel quality/processing study. Volume IV. On-site processing studies, 8:43177 (R;US)
Gustav Hensel KG, Hannover (Germany, F.R.)
Controlled ventilation with heat recovery for residential buildings, 8:44067 (R;DE;In German)

H

Hahnemann Medical Coll. and Hospital, Philadelphia, PA (USA)
Portable fluxgate magnetometer for non-invasive measurement of occupationally acquired lung dust. Progress report, September 15, 1982-September 14, 1983, 8:44766 (R;US)

Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.)
Proposal for extension of the Berlin Research Reactor BER II, 8:43887 (R;DE;In German)

Hahn-Meitner-Institut fuer Kernforschung Berlin G.m.b.H. (Germany, F.R.). Bereich Strahlenchemie
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8:44359 (R;US)

Hamburg Univ. (Germany, F.R.). Lehrstuhl fuer Labensmittelchemie
Occurrence and differentiated analysis of mercury compounds in oceanic animals, 8:44741 (R;DE;In German)

Hammond, City of, IN (USA). Planning and Development Dept.
Homemaker energy management. Final report, 8:44113 (R;US)
Residential energy survey film. Final report, 8:44114 (R;US)

Hanford Engineering Development Lab., Richland, WA (USA)
Computer simulation of displacement cascades in copper, 8:44139 (R;US)

Hannover Univ. (Germany, F.R.)
Energy utilization in the transport of gardening products, 8:44090 (R;DE;In German)

Hannover Univ. (Germany, F.R.). Inst. fuer Technik in Gartenbau und Landwirtschaft
Evaluating of movable thermal screens with regard to the heat consumption of greenhouses, 8:44083 (R;DE;In German)

Hebrew Univ., Jerusalem (Israel)
Analogous mechanisms of biological damage induced by ascorbate and superoxide in the presence of copper. Progress report, July 1982-June 1983, 8:44758 (R;US)

High Life Helicopters, Inc., Puyallup, WA (USA)
Airborne gamma-ray spectrometer and magnetometer survey, Dryden, Texas; Indian Wells, Texas. Volume I. Detail area. Final report, 8:43312 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area, 8:43322 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area, 8:43323 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report, 8:43324 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report, 8:43314 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area, 8:43316 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area, 8:43315 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area, 8:43317 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area, 8:43319 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area, 8:43318 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II A. Detail area, 8:43320 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area, 8:43321 (R;US)

Hochschule der Bundeswehr Muenchen, Neubiberg (Germany, F.R.). Fachbereich Elektrotechnik
Dynamical network feedback of controlled DC drivings with high performance, 8:43739 (R;DE;In German)

Hoegskolan i Luleaa (Sweden). Avdelingen foer Vattenteknik
Rockstore. A plant for seasonal storage of heat, 8:43975 (R;SE;In Swedish)

Hungarian Academy of Sciences, Budapest. Central Research Inst. for Physics
Further development of detector-movement control electronics of whole-body counters, 8:44610 (R;HU;In Hungarian)
Investigation of thermal neutron sensitivity of LiF-TL detectors for routine personnel dosimetry at the thermal column of the ZR-4 reactor, 8:44609 (R;HU;In Hungarian)

I

Idaho National Engineering Lab., Idaho Falls (USA)
Summary of INEL waste reduction/treatment facilities: SWEPP, PREPP, WERF, 8:43352 (R;US)

Illinois Univ., Urbana (USA). Dept. of Physics
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8:44920 (R;US)

IMR Corp., Falls Church, VA (USA). Energy, Management and Marketing Div.
Small business energy regulation project. Final report, 8:44032 (R;US)

INMOS, Colorado Springs, CO (USA)
SNAP-BACK: a stable regenerative breakdown mode of MOS devices, 8:44627 (R;US)

Innsbruck Univ. (Austria)
Meson theory of low-energy elastic nucleon-antinucleon scattering, 8:44929 (R;AT;In German)

Institute of Gas Technology, Chicago, IL (USA)
Acoustic technique for pinpointing leaks in low-pressure gas mains, 8:43297 (R;US)
Coal gasification support studies. Vol. II, Task 2. Studies of fluidized-bed reactors in coal gasification processes. Final report, November 19, 1981-August 15, 1982, 8:43171 (R;US)
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8:43172 (R;US)
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8:43173 (R;US)
New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report, 8:43651 (R;US)
Support research for biomass thermal-gasification development, 8:43422 (R;US)

Institute of Nuclear Physics, Krakow (Poland)
Radiation therapy of cancer of the lung, 8:44775 (R;PL;In Polish)
Radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx, 8:44773 (R;PL;In Polish)
Radiation therapy of tumours of the central nervous system, 8:44774 (R;PL;In Polish)

Institute of Physics and Nuclear Techniques, Krakow (Poland)
Neutron multiplier alternative for fusion reactor blankets, 8:45240 (R;PL)

Institut Francais du Petrole (IFP), 92 - Rueil-Malmaison
Contribution to the study of reforming catalyst aging by coking, 8:43284 (R;FR;In French)

Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil)
Heat conduction in a plate-type fuel element with time-dependent boundary conditions, 8:43864 (R;BR;In Portuguese)
Thermal stresses in a PWR pressure vessel, 8:43771 (R;BR;In Portuguese)

Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Engenharia Nuclear
Application of an automatic pattern recognition for aleatory signals for the surveillance of nuclear reactor and rotating machinery, 8:43749 (R;BR;In Portuguese)

Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Metalurgia Nuclear
New method to calculate pressure drop and shell-side heat transfer coefficient in a shell-and-tube heat exchanger, 8:44420 (R;BR;In Portuguese)
Post irradiation examination on test fuel pins for PWR, 8:43770 (R;BR;In Portuguese)

Instituto de Pesquisas Energeticas e Nucleares, Sao Paulo (Brazil). Centro de Operacao e Utilizacao do Reator de Pesquisas
Experience and research with the IEA-R1 Brazilian reactor, 8:43890 (R;BR)
Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil)
Thermal resistance of a convectively cooled plate with applied heat flux and variable internal heat generation, 8:44414 (R;BR)
Institutt for Energiteknikk, Kjeller (Norway)
BETA3A user' s manual, 8:43274 (R;NO)
BETAPLOT user' s manual, 8:43275 (R;NO)
Denpendency models and probability of joint events, 8:44444 (R;NO)
Severe slugging in two-phase flow systems, 8:43290 (R;NO)
Suggestions concerning the use of failure data, 8:44445 (R;NO)
International Atomic Energy Agency, Seibersdorf (Austria). Laboratories
Treatment of cancer of the uterus in developing countries: Proposals for a programme, 8:44768 (R;XA)
International Atomic Energy Agency, Vienna (Austria)
Non-destructive technique for qualitative and attribute verification of spent fuel elements. Final report for the period 1 May 1980 - 31 July 1982, 8:43794 (R;XA)
Nuclear-fuel-cycle education: Module 10. Environmental consideration, 8:43394 (R;US)
Preparation of permselective membranes by means of radiation induced grafting. Part of a coordinated programme on radiation modified polymers for biomedical and biochemical applications. Final report for the period 1 August 1980 - 31 August 1982, 8:44360 (R;XA)
Radiation damage studies in fusion reactor materials. Part of a coordinated programme on energetic particle interactions with materials of importance for fusion reactors. Final report for the period 1 February 1977 - 15 December 1980, 8:45225 (R;XA)
Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982, 8:44791 (R;XA)
Sterilization of topical products by cobalt-60. Coordinated programme in practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 August 1980 - 31 July 1981, 8:44792 (R;XA)
International Atomic Energy Agency, Vienna (Austria). International Nuclear Data Committee
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8:43842 (R;XA)
First research coordination meeting on atomic collision data for diagnostics of magnetic fusion plasmas, Vienna, 21-25 June 1982. Summary report, 8:45112 (R;XA)
International Business Services, Inc., Washington, DC (USA)
Active solar heating and cooling program analysis and reporting. Final technical report, 13 November 1980-31 January 1982, 8:44050 (R;US)
International Centre for Theoretical Physics, Trieste (Italy)
Acoustic plasma wave in inversion layers and sandwich structures, 8:45107 (R;XA)
Kinetic theory of parametric resonance in relativistic plasma, 8:45108 (R;XA)
Surface density profile and surface tension of the one-component classical plasma, 8:45109 (R;XA)
INVECO, Inc., Huntington Beach, CA (USA)
Commercialization of the power-factor controller. Final report, 8:44076 (R;US)
Iowa State Univ. of Science and Technology, Ames (USA). Engineering Research Inst.
Photoelastic study of the effects of an impulsive seismic wave on a nuclear containment vessel, 8:43855 (R;BR)
Photothermoelastic simulation of transient thermal stresses, 8:44418 (R;BR)
Israel Atomic Energy Commission, Beersheba. Nuclear Research Center-Negev
Fading and buildup in TLD-100 cards used for personal dosimetry, 8:44621 (R;IL;In Hebrew)
Microprocessor-based power control data acquisition system, 8:43872 (R;IL;In Hebrew)
Israel Atomic Energy Commission, Yavne. Soreq Nuclear Research Center
Laser fusion (for pedestrians), 8:45220 (R;IL)

J

Japan Atomic Energy Relations Organization, Tokyo
Nuclear energy and its public acceptance in Japan, 8:44020 (R;BE;In French)
Jet Propulsion Lab., Pasadena, CA (USA)
Photovoltaic energy systems. Program summary, fiscal year 1982, 8:43491 (R;US)
Joint Inst. for Nuclear Research, Dubna (USSR)
ACTIV-computer code for automatic processing of γ-ray spectra, 8:45298 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Dept. of New Acceleration Methods
Bywalled plasma formation in vacuum prolonged channels, 8:45144 (R;SU;In Russian)
Computer simulation of radiation instability in relativistic electron rings, 8:44499 (R;SU;In Russian)
Effect of nonlinear ion space charge forces on the ion beam parameters of a collective accelerator, 8:44498 (R;SU;In Russian)
Head model of SILUND-20 linear induction accelerator, 8:44476 (R;SU;In Russian)
Hydrodynamic characteristics of a horizontal channel on the helium two-phase flow motion, 8:44428 (R;SU;In Russian)
Induction pick-up of placement of electron beam centre of gravity, 8:44541 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Computing Techniques and Automation
Comparative characteristics of program simulators of SHP and HDR special processors for on-line data processing, 8:44604 (R;SU;In Russian)
Comparative characteristics of programs for statistical distribution collection in the HBOOK system, 8:45296 (R;SU;In Russian)
Numerical simulation of the motion of a dense electron bunch interacting with a pulsed accelerating field in an inhomogeneous cavity, 8:44500 (R;SU;In Russian)
Operation with files in the mode of sequential access in the system of spectra processing, 8:45299 (R;SU;In Russian)
Parameter choice of a special microprocessor, 8:44583 (R;SU;In Russian)
Program controlled system for mathematical processing the αp-experiment data, 8:44603 (R;SU;In Russian)
Program selection of physical hypothesis in the film information processing system, 8:44599 (R;SU;In Russian)
Purpose and the principle of the organization of the automatic system for film information processing (ASMOFI), 8:44600 (R;SU;In Russian)
Simulation of ionization front forming at injection of relativistic electron beam in a gas chamber, 8:44549 (R;SU;In Russian)
Software development minimum guidance system. Algorithm and specifications of realizing special hardware processor data prefilter program, 8:44605 (R;SU;In Russian)
Software structure of computer graphics for on-line physical experiments, 8:45297 (R;SU;In Russian)
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of High Energy
Application of light pipes with large cross sections for transmission of service data image to the photographic film of a hydrogen chamber, 8:44593 (R;SU;In Russian)
Basis software for microprogrammed channel controller for operation on-line with experimental physical installations, 8:44637 (R;SU;In Russian)
Dubna synchrophasotron. Operation and improvement (June - September, 1981), 8:44537 (R;SU;In Russian)
Investigation of characteristics of multistep avalanche chamber, 8:44591 (R;SU;In Russian)
Low pressure drift chamber in experiment on studies of radiation of relativistic particles in single crystals, 8:44607 (R;SU;In Russian)
Microprocessor control system for large helium liquefier, 8:44388 (R;SU;In Russian)
Multichannel fiber-optical lines in the control system of the "Polaris" source, 8:44543 (R;SU;In Russian)
Organization of M-6000 computer operation on-line with experimental apparatus, 8:44585 (R;SU;In Russian)
Position of the magnetic median surface in the magnet of the JINR synchrophasotron, 8:44495 (R;SU;In Russian)

Problems of optimal data coding in hodoscopic systems, 8:44606 (R;SU;In Russian)
Refrigeration of pulsed superconducting magnets with coil parallel cooling by two-phase helium, 8:44536 (R;SU;In Russian)
Unified software of the ES-1040 computer for organization of graphic data representation in program packages of the "Disc-2" and "SYaO" real time systems, 8:45295 (R;SU;In Russian)
Unified system for information exchange between the ES-1040 computer and physical equipment via the MKK 880M controller, 8:44638 (R;SU;In Russian)
Using heat pipes for cooling detectors and preamplifiers inside the vacuum chamber of the accelerator in a spectrometer of recoil nuclei, 8:44586 (R;SU;In Russian)
Vessel for cryogenic liquid with a flexible vacuum shell, 8:44387 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Neutron Physics
Automation of measurements, parameter correction and control of the LIU-30 accelerator, 8:44539 (R;SU;In Russian)
Neutron scintillation detector for the time-of-flight spectrometry, 8:44592 (R;SU;In Russian)
Texture analysis on the base of incomplete pole figures. Mathematical substantiation and the ICPOFI program description, 8:45300 (R;SU;In Russian)
Two-parameter "Time-detector's number" analyzer based on a minicomputer for the KDSOG-M neutron spectrometer, 8:44595 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Problems
Automatic information system for nuclear spectrometric experiments, 8:44364 (R;SU;In Russian)
Coaxial detectors from superpure germanium, 8:44596 (R;SU;In Russian)
Definition of the structure layers of semiconductor detectors by means of charged particles, 8:44594 (R;SU;In Russian)
Determination of beam particle track parameters in experiments on the MIS installation (JINR), 8:44584 (R;SU;In Russian)
Experiments on the orbit expansion effect, 8:44494 (R;SU;In Russian)
Helium streamer chamber with laser track registration at gas pressure up to 5 atm, 8:44587 (R;SU;In Russian)
Investigation of possibility for using color threshold detectors in the determination of accelerated ion fluence, 8:44598 (R;SU;In Russian)
Laser streamer chambers with increased pressure, 8:44601 (R;SU;In Russian)
Liquid-tritium target for mesoatomic and mesomolecular experiments, 8:44544 (R;SU;In Russian)
Magnetic spectrometer data handling of JINR. Data handling system and pattern recognition of events, 8:44582 (R;SU;In Russian)
Magnetic system for investigation of the orbit expansion effect on the electron model of a ring cyclotron, 8:44477 (R;SU;In Russian)
Measurements of the mean energy of proton beam (approximately 1 GeV) extracted from the LINF synchrocyclotron using the Cherenkov method of double reflections, 8:44542 (R;SU;In Russian)
On-line electronic system for a multilayer semiconductor spectrometer, 8:44588 (R;SU;In Russian)
Optical constants of magnetic spark spectrometer, 8:44581 (R;SU;In Russian)
$\Delta p/p$ beam particle determining in the MIS installation (JINR), 8:44590 (R;SU;In Russian)
Software for the SONET computer network intended for automation of scientific experiments, 8:43891 (R;SU;In Russian)
Surface-barrier detectors made of silicon doped by phosphorus in thermal neutron flux, 8:44589 (R;SU;In Russian)
Transport channel for extracted proton beam of JINR phasotron, 8:44538 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Nuclear Reactions
Approach for calculations of the ion optical parameters of beams with high current density, 8:44497 (R;SU;In Russian)
Approach for calculations of the parameters of iion beams based on the paraxial equation, 8:44496 (R;SU;In Russian)
Cyclotron acceleration of C_{12}^{3+} ions produced in a laser plasma, 8:44548 (R;SU;In Russian)
Laser ion source for a mass spectrometer, 8:44602 (R;SU;In Russian)
MT-22 microtron, 8:44547 (R;SU;In Russian)
Radiation situation on the 16 MeV electron accelerator-microtron, 8:44545 (R;SU;In Russian)
Systems of supply and monitoring of MT-22 microtron, 8:44540 (R;SU;In Russian)
Temperature distribution in targets irradiated by heavy ions, 8:44546 (R;SU;In Russian)

Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics
About one Newell's result and the quantum mechanical check of the microcanonical distribution, 8:45081 (R;XJ)
Study on the high-energy neutron fluence and dose rate meter response, 8:44597 (R;SU;In Russian)

Junta de Energia Nuclear, Madrid (Spain)
Calculation of the detection efficiency in liquid scintillators. II. Single positron emitters, 8:44579 (R;ES;In Spanish)
Calculation of the detection efficiency in liquid scintillators. III. Single electron-capture radionuclides, 8:44580 (R;ES;In Spanish)

K

Kansas State Univ., Manhattan (USA)
Nuclear-fuel-cycle education: Module 6. Criticality safety, 8:43401 (R;US)
Nuclear-fuel-cycle education: Module 10. Environmental consideration, 8:43394 (R;US)
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8:43309 (R;US)
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8:43746 (R;US)
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8:43829 (R;US)
Nuclear-fuel-cycle education: Module 1. Nuclear fuel cycle overview, 8:43330 (R;US)
Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8:43830 (R;US)
Nuclear-fuel-cycle education: Module 9. Safeguards, 8:43402 (R;US)
Nuclear-fuel-cycle education: Module 8. Waste management, 8:43345 (R;US)
Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8:43329 (R;US)

Kansas Univ. Center for Research, Inc., Lawrence (USA)
EPRI conference proceedings: solar and wind power - 1982 status and outlook, 8:43536 (R;US)

Karlsruhe Univ. (T.H.) (Germany, F.R.)
Institute in the year of 1981, 8:44013 (R;DE;In German)

Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Bio- und Geowissenschaften
Impact of cofactors and inhibitors on DNA repair synthesis after γ-irradiation in semi-permeable Escherichia coli cells, 8:44795 (R;DE;In German)

Karlsruhe Univ. (T.H.) (Germany, F.R.). Fakultaet fuer Physik
Investigation of real niobium surfaces by rf-measurements between 12 and 18GHz, 8:44389 (R;DE;In German)

Karlsruhe Univ. (T.H.) (Germany, F.R.). Sonderforschungsbereich Ausbreitungs- und Transportvorgaenge in Stroemungen
Measurement of jet propagation in the intermediate near-field of a coolant water outlet, 8:44751 (R;DE;In German)
Resistance characteristics of rough open channels with a rigid boundary, 8:44433 (R;DE)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.)
Julich Nuclear Researh Institute annual report, 1980/81, 8:43835 (R;DE;GE)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Nukleare Sicherheitsforschung
Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500, 8:43922 (R;DE;In German)

Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorentwicklung
Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors, 8:43791 (R;DE;In German)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorwerkstoffe und Heisse Zellen
Migration behaviour of fission products in and from spherical HTR fuel elements (SAPHIR loop experiments in the PEGASE reactor), 8:43848 (R;DE)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Programmgruppe Systemforschung und Technologische Entwicklung
Emissions from coal utilization facilities and possible abatement measures, 8:43239 (R;DE;In German)
Kernforschungsanlage Juelich G.m.b.H. (Germany, F.R.). Projektleitung Energieforschung
Seminar and status report 'wind energy', 8:43671 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Abt. fuer Angewandte Systemanalyse
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8:43240 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Hauptabteilung Sicherheit
Biological effects of radium, 8:44799 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Genetik und Toxikologie von Spaltstoffen
Alpha radiation-induced alterations of the proliferation kinetics, chromatin structure and gene expression in mammalian cells, 8:44798 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Kern- und Teilchenphysik
Atomic and nuclear properties of materials, 8:45048 (R;DE)
Investigation of real niobium surfaces by rf-measurements between 12 and 18GHz, 8:44389 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Material- und Festkoerperforschung
Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures, 8:43810 (R;DE;In German)
Irradiation experiment Mol-7B, 8:43809 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Neutronenphysik und Reaktortechnik
Accident consequences and risk assessments based on the probabilistic safety study of a nuclear power plant with a high temperature reactor (HTR-1160), 8:43927 (R;DE;In German)
Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis, 8:43849 (R;DE)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Inst. fuer Reaktorbauelemente
Impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle, 8:43808 (R;DE)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Lab. fuer Isotopentechnik
Testing of the antiwear properties of synthetic engine oils by the use of radionuclide technique, 8:44608 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Prozesslenkung mit Datenverarbeitungsanlage
Computer program GANBEO, 8:43299 (R;DE;In German)
Supervision and control of gas transportation and distribution systems, 8:43300 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Schneller Brueter
Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures, 8:43810 (R;DE;In German)
Impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle, 8:43808 (R;DE)
Investigations by model theory of fast breeder reactor fuel pins and application to special safety experiments, 8:43928 (R;DE;In German)
Irradiation experiment Mol-7B, 8:43809 (R;DE;In German)
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8:43923 (R;DE;In German)
Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis, 8:43849 (R;DE)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekttraegerschaft Fertigungstechnik
Development of an adaptive control of deep-hole-drilling, 8:44390 (R;DE;In German)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Projekt Wiederaufarbeitung und Abfallbehandlung
Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis, 8:43849 (R;DE)
Kernforschungszentrum Karlsruhe G.m.b.H. (Germany, F.R.). Zyklotronlaboratorium
Laser induced fluorescence spectroscopy in atomic beams of radioactive nuclides, 8:44879 (R;DE)
Kiel Univ. (Germany, F.R.). Inst. fuer Meereskunde
Fucus Vesiculosus as a bioaccumulator of heavy metals, 8:44807 (R;DE;In German)
KMS Fusion, Inc., Ann Arbor, MI (USA)
Image-enhancement tools for tracing fringe patterns in holographic interferograms acquired during laser-fusion experiments. KMSF-U-1346, 8:45214 (R;US)
Koeln Univ. (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet
Surface ozone in the Cologne region, 8:44683 (R;DE;In German)

L

Laboratorio de Computacao Cientifica, Rio de Janeiro (Brazil)
Mechanical modelling of a structural performance of a pressure vessel submitted to the creep phenomenon, 8:43857 (R;BR;In Portuguese)
Lagos Univ. (Nigeria). Dept. of Mechanical Engineering
Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above, 8:44424 (R;BR)
Laguna Research Lab., Laguna Beach, CA (USA)
Data reduction for aerosol coagulation experiments with wall loss. Topical report No. 1, 8:44664 (R;US)
Landbouwhogeschool Wageningen (Netherlands)
Salmonella radicidation of poultry carcasses, 8:44793 (R;NL)
Lane and Edson, P.C., Washington, DC (USA)
Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience, 8:44074 (R;US)
Law Engineering Testing Co., Atlanta, GA (USA)
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8:44008 (R;US)
Lawrence Berkeley Lab., CA (USA)
Aspects of data on the breakup of highly excited nuclei, 8:44931 (R;US)
CAMAC interface for TPC data-acquisition electronics, 8:44620 (R;US)
CHEMTRN user's manual, 8:44744 (R;US)
Compilation of geothermal information: exploration, 8:43652 (R;US)
Determination of the state of stress at the Stripa Mine, Sweden, 8:43363 (R;US)
Electrical properties of glassy carbon, 8:44281 (R;US)
Electromagnetic soundings over a geothermal reservoir in Dixie Valley, Nevada, 8:43656 (R;US)
Equilibrium charge states of uranium at relativistic energies, 8:44880 (R;US)
Geohydrological data from the macropermeability experiment at Stripa, Sweden, 8:44818 (R;US)
GMINC: a mesh generator for flow simulations in fractured reservoirs, 8:43269 (R;US)
High-resolution electron-microscopy studies of native oxide on silicon, 8:44283 (R;US)
Holographic window coatings for solar control and daylighting: assessment report, 8:44082 (R;US)
Influence of oxygen on segregation of chromium at structural damage in gallium arsenide, 8:44282 (R;US)
Local networking with intelligent nodes, 8:45304 (R;US)
LULU analysis program, 8:44553 (R;US)
Mathematical modeling and optimization of liquid-junction photovoltaic cells, 8:43501 (R;US)
Meson emissions from quark-gluon plasma through formation and fission of chromoelectric flux tubes, 8:44932 (R;US)
Numerical modeling to assess possible influence of the mine openings on far-field in-situ stress measurements at Stripa, 8:43361 (R;US)

Petrology and radiogeology of the Stripa pluton, 8:44817 (R;US)
Recent advances in high-speed photon detectors, 8:44619 (R;US)
Technical issues for building energy ratings, 8:44081 (R;US)
Water inflow into boreholes during the Stripa heater experiments, 8:43362 (R;US)

Lawrence Livermore National Lab., CA (USA)
Additional symbols used in double-spaced text for Wang OIS word-processor users, 8:45316 (R;US)
Alternative connections for the large MFTF-B solenoids, 8:45260 (R;US)
Analytical investigation concerning condensation of steam with low air content, 8:43967 (TG;US)
Avalanche devices state-of-the-art, 8:44454 (R;US)
CAMDAS (CAMAC data-acquisition system), 8:45315 (R;US)
Centralia partial-seam CRIP test, 8:43186 (R;US)
Concentration and distribution of copper in effluents from the H.B. Robinson Steam Electric Plant, 8:43877 (R;US)
Cytometric analysis of mammalian sperm for induced morphologic and DNA content errors, 8:44801 (R;US)
Equation of state of TiH_2. Progress report, 8:44244 (R;US)
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8:44977 (R;US)
Grounding guidelines: practical examples for power systems at LLNL, 8:44447 (R;US)
High-pressure equation of state of Li, Na, and K, 8:44199 (R;US)
Hugoniot measurements in vanadium using the LNL two-stage light-gas gun, 8:44201 (R;US)
Initial guidance on digraph-matrix analysis for systems interaction studies, 8:43939 (R;US)
Isolating the climatogenic effects of volcanoes, 8:44815 (R;US)
Measured stimulated Raman gain in methane, 8:44401 (R;US)
National Mirror Fusion Program Plan, 8:45259 (R;US)
Optical shutters using microchannel plate (MCP) intensifier tubes, 8:44645 (R;US)
Plotting CV drawings on an electron-beam recorder, 8:45317 (R;US)
Preliminary report on the LSDM transport sub-model TRANZAM, 8:44690 (R;US)
Probability problems in seismic risk analysis and load combinations for nuclear power plants, 8:43952 (R;US)
Proceedings of the interagency conference on the environment, 8:43990 (R;US)
Program report for FY 1982: Atmospheric and Geophysical Sciences Division of the Physics Department, 8:44691 (R;US)
Properties of hot expanded liquid aluminum, 8:44200 (R;US)
Rayleigh-Taylor instability and resulting failure modes of ablatively imploded inertial-fusion targets, 8:45261 (R;US)
Simulations and parameter-variation studies of heavy-gas dispersion using the SLAB model, 8:44693 (R;US)
Small and light thyratron grid driver, 8:44455 (R;US)
Syntax and semantics of a LINCS control monologue, 8:45314 (R;US)
Theoretical analysis of the past variations in global atmospheric composition and temperature structure, 8:44692 (R;US)
US-DOE Fusion-Breeder Program: blanket design and system performance, 8:45263 (R;US)
Use of fusion-welding techniques in fabrication of a superconducting-magnet thermal-shield system, 8:45262 (R;US)
Use of ORACLE in a scientific environment, 8:45265 (R;US)
Uses of ORACLE in the Nova Laser Control System, 8:45264 (R;US)

Lehigh Univ., Bethlehem, PA (USA). Inst. of Thermo-Fluid Engineering and Science
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 1. Main report and Appendices A-D, 8:44429 (R;US)
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 2. Appendix E, 8:44430 (R;US)

Lewin and Associates, Inc., Washington, DC (USA)
Conceptual models for gas hydrates. Phase I. Technical Directive 6. Final report, 8:43295 (R;US)

Liege Univ. (Belgium). Lab. de Physique du Batiment
Contribution to improving relibility assessments of mechanical structural components requiring a high degree of safety using weighted Monte Carlo simulation, 8:44446 (R;DE;In German)
Main characteristics of housing permitting reduced energy consumption for heating. Final report, 8:44079 (R;XE)

Little (Arthur D.), Inc., Cambridge, MA (USA)
Economic and energy audit of converting waste plastics to oil. Final report, 8:44102 (R;US)
Economic and energy audit of textile foam processing, 8:44103 (R;US)

Lockheed-California Co., Burbank (USA)
100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results, 8:43706 (R;US)

Lockheed Missiles and Space Co., Sunnyvale, CA (USA). Ocean Systems Div.
Ocean thermal-energy-conversion power-system development. Phase I. Preliminary design report. Volume II. Appendixes A, B, and C, 8:43543 (R;US)

Los Alamos National Lab., NM (USA)
Case-control study of brain tumors among white males employed at the Rocky Flats Plant, 8:44800 (R;US)
Design and testing of a prototype water-cooled vacuum interrupter for use in superconducting-magnet protection circuits, 8:45253 (R;US)
End-crop box counter manual, 8:43405 (R;US)
Evaluation of geochemical properties used in area-to-location screening for a nuclear waste repository at the Nevada Test Site, 8:43357 (R;US)
Evidence for stacking faults in multiaxial strained alpha-brass, 8:44172 (R;US)
Experimental investigation of muon-catalyzed fusion in high-density deuterium-tritium mixtures, 8:45215 (R;US)
High resolution studies of pion-nucleus reaction mechanism, 8:44975 (R;US)
Hydrodynamics and relativistic heavy-ion collisions, 8:44930 (R;US)
Hydrogen-burn analyses of ice-condenser containments, 8:43942 (R;US)
Los Alamos National Laboratory computer benchmarking 1982, 8:45303 (R;US)
MC and A reform amendment: variance estimates and performance evaluation, 8:43410 (R;US)
Neutron streaming through straight and single bend slots, 8:45255 (R;US)
Operation manual: mini-segmented gamma scanner, 8:44618 (R;US)
Pajarito Plan for Radiation Emergency. Standard operating procedures, 8:43894 (R;US)
Pyrochemical recovery of plutonium fluoride reduction slag, 8:43358 (R;US)
Real-time inventory system for special nuclear material in storage, 8:43406 (R;US)
Research and development related to the Nevada Nuclear Waste Storage Investigations. Progress report, October 1-December 31, 1982, 8:43359 (R;US)
Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings, 8:43347 (R;US)
Research on the characterization and conditioning of uranium mill tailings. III. Summary of uranium mill tailings conditioning research and implications regarding remedial actions, 8:43348 (R;US)
RSX system development under VAX/VMS compatibility mode, 8:44552 (R;US)
Simulation of rock blasting with the SHALE code, 8:43302 (R;US)
Single-pulse coherent Raman spectroscopy in shock-compressed benzene, 8:44327 (R;US)
Space nuclear-safety program. Progress report, January 1983, 8:43417 (R;US)
Status of volcanic hazard studies for the Nevada Nuclear Waste Storage Investigations, 8:43356 (R;US)
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8:43306 (R;US)
Summary of the workshop on regulatory-financial models of the US electric utility industry, 8:44044 (R;US)
Technology transfer to the East: an annotated bibliography for 1976 to 1981, 8:43981 (R;US)
Tokamak poloidal-field systems. Progress report, January 1-December 31, 1982, 8:45254 (R;US)
Transient effects and pump depletion in stimulated Raman scattering, 8:44399 (R;US)
Use of fiber optics and laser-induced fluorescence for remote measurements of UF_6 in strong rotation, 8:44639 (R;US)
Vectorized Monte Carlo photon transport, 8:45049 (R;US)

Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume I, 8:43371 (R;US)
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume II, 8:43372 (R;US)
Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM (USA)
Agglomeration of welding smoke: a comparison between experiments and theoretical calculation of welding-smoke agglomeration speed, 8:44695 (TG;US)
Lulea Univ., (Sweden)
Determination of the state of stress at the Stripa Mine, Sweden, 8:43363 (R;US)
Lund Univ. (Sweden)
Right and left ventricular ejection fraction at rest and during exercise assessed with radionuclide angiocardiography, 8:44772 (R;SE;In Swedish)
Lund Univ. (Sweden). Dept. of Cosmic and Subatomic Physics
Calendar of high multiplicity ^{12}C induced reactions in Ag (Br), 8:45000 (R;SE)
Correlations between projectile and target break-up in intermediate and high energy heavy ion collisions, 8:44976 (R;SE)

M

Martini Engineering, Richland, WA (USA)
Stirling engine design manual. Second edition, 8:44123 (R;US)
Maryland Univ., College Park (USA). Dept. of Physics and Astronomy
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8:44197 (R;US)
Massachusetts Inst. of Tech., Cambridge (USA). Plasma Fusion Center
Internal modes in high-temperature plasmas, 8:45100 (R;US)
Massey Univ., Palmerston North (New Zealand). Food Technology Research Centre
Total energy requirements of food retailing, 8:44047 (R;NZ)
Total energy requirements of shopping for food, 8:44048 (R;NZ)
Materials Engineering Associates, Inc., Lanham, MD (USA)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions I and II. Vol. 1, 8:43751 (R;US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8:44178 (R;US)
Max-Planck-Institut fuer Physik und Astrophysik, Garching (Germany, F.R.). Inst. fuer Extraterrestrische Physik
Accreting neutron stars, 8:44825 (R;BG)
Observations of fast, transient gamma-ray phenomena, 8:44826 (R;DE)
McKee (Davy) Corp., Cleveland, OH (USA)
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8:43167 (R;US)
Coal-gasification basic research and cost studies. Quarterly report 2, 8:43168 (R;US)
Mechanical Technology, Inc., Latham, NY (USA)
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8:43169 (R;US)
Melbourne Univ., Parkville (Australia). School of Physics
Algebraic description of perturbation theory in quantum electrodynamics, 8:44949 (R;AU)
Anomalous dimension matrices of four quark operators, 8:45082 (R;AU)
Charged particle reaction cross sections and nucleosynthesis, 8:44827 (R;AU)
Consequences of the neglect of TDS correction for temperature parameters, 8:44646 (R;AU)
Meteorology Research, Inc., Altadena, CA (USA)
Sulfate aerosols from western low-rank coal-fired boilers with FGD: summary of tests at Coal Creek, Clay Boswell, Milton R. Young, and San Miguel stations. MRI-83-FR-1849, 8:43213 (R;US)
Miami Univ., Oxford, OH (USA). Dept. of Architecture
Passive-solar simulation analysis, 8:43640 (R;US)
Miljoestyrelsen, Roskilde (Denmark). Luftforureningslab.
Plume rise, 8:44679 (R;DK;In Danish)
Trajectory model with varying mixing height, 8:44680 (R;DK;In Danish)
Minerals Management Service, Los Angeles, CA (USA). Pacific OCS Region
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. I. Final environmental-impact statement OCS Sale No. 73, 8:43288 (R;US)
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. II. Final environmental-impact statement OCS Sale No. 73, 8:43289 (R;US)
Ministerium fuer Wirtschaft, Mittelstand und Verkehr des Landes Nordrhein-Westfalen, Duesseldorf (Germany, F.R.)
Dirt management in Ruhr coal mines, 8:43220 (R;DE;In German)
Minnesota Univ., Minneapolis (USA). Dept. of Chemical Engineering and Materials Science
Flow in porous media, phase behavior and ultralow interfacial tensions: mechanisms of enhanced petroleum recovery. Final report, 8:43270 (R;US)
Minnick (L. John), Plymouth Meeting, PA (USA)
Development of potential uses for the residue from fluidized-bed-combustion processes. Final report covering results of research program and recommended practices for potential users, 8:44096 (R;US)
Mississippi State Univ., Mississippi State (USA)
Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8:43830 (R;US)
Mitre Corp., McLean, VA (USA)
FORSITE, a multiple-project management system: overview and general description, 8:43653 (R;US)
FORSITE, a multiple-project management system: production of critical-path development schedules for geothermal electric-power-generation projects, 8:43663 (R;US)
Geothermal Progress Monitor: system status and operational experience, 8:43659 (R;US)
Mobil Research and Development Corp., Paulsboro, NJ (USA)
Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981, 8:43423 (R;US)
Monosolar, Inc., Santa Monica, CA (USA)
Improved semiconductors for photovoltaic solar cells. Final report, July 15, 1977-July 14, 1978, 8:43492 (R;US)
Montana Univ., Missoula (USA)
Final report on total cross section measurements, 8:44974 (R;US)
Mountain Fuel Supply Co., Salt Lake City, UT (USA)
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8:43249 (R;US)
Muenchen Univ. (Germany, F.R.)
Correlation of radiation sensitivity and nitrofurantoin sensitivity of Escherichia coli K-12, 8:44796 (R;DE;In German)
Muenchen Univ. (Germany, F.R.). Fachbereich Tiermedizin
Effect of some radioprotective and radiosensitizing substances on the semiconservative and unscheduled DNA biosynthesis of rat thymocytes, 8:44797 (R;DE;In German)
Muenchen Univ. (Germany, F.R.). Fakultaet fuer Medizin
Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers, 8:44363 (R;DE;In German)

N

Naemnden foer Energiproduktionsforskning, Stockholm (Sweden)
Aeroelastic stability and dynamic response analysis of the LDB-125 vertical axis wind turbine, 8:43716 (R;SE)
Growth of mold in fuel chips, 8:43503 (R;SE;In Swedish)
Pellets as fuel. Basic properties and experience from tests in moving grate firing units, 8:43471 (R;SE;In Swedish)
Solubility of rocks and minerals in hot water. The chemical changes of water on heat storage in caverns, 8:43972 (R;SE;In Swedish)
Sour felling, 8:43502 (R;SE;In Swedish)

Strategic analysis. A proposal for a method of investigation illustrated by the future competing situation of coal with biomass fuels, 8:43266 (R;SE;In Swedish)
Structure of turbulence at Maglarp 1, 8:43676 (R;SE;In Swedish)
System for the investigation of peat bog by radar. Final report. Stage 2, 8:43244 (R;SE;In Swedish)
Vyrmethane. Progress report stage 5. In situ production of methane gas from peat, 8:43182 (R;SE;In Swedish)

Nagoya Univ. (Japan). Inst. of Plasma Physics
Observation of spatial alfven resonance, 8:45138 (R;JP)
Theory of drift instabilities and the associated anomalous transport, 8:45143 (R;JP)

Naramore, Bain, Brady, and Johanson, Seattle, WA (USA)
Results of the test application of the Process Standard, 8:44075 (R;US)

Natal Univ., Durban (South Africa). Dept. of Electronic Engineering
Investigation into the organisation and structural design of multi-computer process-control systems, 8:44633 (R;ZA)

National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center
Comparison of road-load-simulator test results with track tests on electric-vehicle propulsion system, 8:44126 (R;US)
Electrochemical rebalance cell for Redox systems, 8:44057 (R;US)

National Bureau of Standards, Washington, DC (USA)
Determine atomic data pertinent to the magnetic-fusion-energy program for one-half of FY 1984, 8:45103 (R;US)

National Fertilizer Development Center, Muscle Shoals, AL (USA)
Fertilizer trends 1982, 8:44009 (R;US)

National Lab. for High Energy Physics, Oho, Ibaraki (Japan)
Proceedings of the 3rd meeting on ultra high vacuum techniques for accelerators and storage rings, Tsukuba, January 24-25, 1980, 8:44448 (R;JP;JA)

National Petroleum Council, Washington, DC (USA)
Third World petroleum development: a statement of principles, 8:44039 (R;US)

National Tsing Hua Univ., Hsinchu (Taiwan). Dept. of Physics
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8:44242 (R;US)

Nauchno-Issledovatel'skij Inst. Atomnykh Reaktorov, Dimitrovgrad (USSR)
Development of the installation for zirconium alloy corrosion testing in superheated steam flow in a reactor channel, 8:43792 (R;SU;In Russian)
Experimental study on hydrodynamics of the up-draught part of the VK-50 boiling water reactor, 8:43750 (R;SU;In Russian)
Fast neutron fluxes and spectra in the RBT-6 reactor channels, 8:43892 (R;SU;In Russian)
Method for calculating the lifetime of a heterogeneous reactor with regular lattice of reactor control system elements, 8:43850 (R;SU;In Russian)
Metrology installation for studies of the accuracy of correlation methods for sodium flow rate measurements, 8:43812 (R;SU;In Russian)
Spectral analysis of some problems for neutron thermalization, 8:43851 (R;SU;In Russian)

Nauchno-Issledovatel'skij Inst. Ehlektrofizicheskoj Apparatury, Leningrad (USSR)
Electric strength and probability of breakdown of high-voltage insulation of nanosecond accelerators, 8:44478 (R;SU;In Russian)
Electrophysical apparatus. Issue 18. Collection of articles, 8:45233 (R;SU;RU)
Eletrophysical apparatus. Issue 19. Collection of articles, 8:45236 (R;SU;RU)

Nebraska Univ., Lincoln (USA). Dept. of Chemistry
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8:44349 (R;US)

Nevada Univ., Las Vegas (USA). Desert Research Inst.
Analysis of the annual temperature wave propagating through an alluvial soil, 8:44720 (R;US)
Geological reconnaissance and chronologic studies. Technical report No. 33, 8:44712 (R;US)

Nevada Univ., Reno (USA). Desert Research Inst.
Economic potential of alternative land and natural resource uses at the Nevada Test Site, Nye County, Nevada, 8:44721 (R;US)
Preliminary review and summary of the potential for tectonic, seismic, and volcanic activity at the Nevada Test Site defense waste disposal site, 8:43343 (R;US)

Nevada Univ., Reno (USA). Water Resources Center
Relations between soil chemistry and moisture movement, 8:44711 (R;US)

New England Innovation Group, Providence, RI (USA)
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I, 8:44109 (R;US)
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8:44110 (R;US)

New Mexico Inst. of Mining and Technology, Socorro (USA). New Mexico Petroleum Recovery Research Center
Displacement of oil by carbon dioxide. Annual report, October 1981-September 1982, 8:43276 (R;US)

New Mexico State Univ., Las Cruces (USA)
CO_2 formation damage study. Final report, 8:43273 (R;US)

New Mexico State Univ., Las Cruces (USA). New Mexico Energy Inst.
Consumer-behavorial analysis of alternate-energy adoption: the case of geothermal energy in New Mexico. Final report, 6/1/80-8/1/81, 8:43661 (R;US)
Regional operations research program for commercialization of geothermal energy in the Rocky Mountain basin and range. Final technical report, January 1980-March 1981, 8:43660 (R;US)

New Mexico Univ., Albuquerque (USA)
Nuclear-fuel-cycle education: Module 6. Criticality safety, 8:43401 (R;US)
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8:43309 (R;US)

New Mexico Univ., Albuquerque (USA). Inst. for Modern Optics
Transient effects and pump depletion in stimulated Raman scattering, 8:44399 (R;US)

New Mexico Univ., Albuquerque (USA). New Mexico Energy Inst.
Russian fireplace: demonstrations and workshops. Final report, January 1, 1980-January 31, 1981, 8:44084 (R;US)

New Zealand Energy Research and Development Committee, Auckland
Fermentation studies on extracts of beet, 8:43452 (R;NZ)

NLO, Inc., Cincinnati, OH (USA)
Data-acquisition system for the NLO error-propagation exercise, 8:43407 (R;US)

Nordwestdeutsche Kraftwerke A.G., Hamburg (Germany, F.R.)
Nordwestdeutsche Kraftwerke A.G.: 80. business report, 8:44111 (R;DE;In German)
Nordwestdeutsche Kraftwerke A.G.: 81. business report, 8:44112 (R;DE;In German)

Norges Teknisk-Naturvitenskapelige Forskningsraad, Oslo. Program for Oljevernberedskap
Full scale tests with oil recovery systems offshore. Norway, June 1980, 8:43287 (R;NO)

Norsk Inst. for Luftforskning, Kjeller
Determination of human exposure using measured data of Cd, As and Pb, 8:43241 (R;NO)
Effect of future centralized heating in Oslo on air quality. Pt. 1, 8:44708 (R;NO;In Norwegian)
Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content, 8:44173 (R;NO)
Occurrence of fungus spores in chip combustion and storage installations. II., 8:43504 (R;NO;In Norwegian, English)
Photochemical oxidants in north-western Europe 1976-79. A pilot project, 8:44681 (R;NO)
Prediction of hazard area resulting from a gas release, 8:43294 (R;NO)
Spatial distribution of the trace element emission from conventional thermal power plants in Europe, 8:44682 (R;NO)

North Carolina State Univ., Raleigh (USA)
Comparison of analytical models and experimental results for single-event upset in CMOS SRAMs, 8:44628 (R;US)

North Carolina Univ., Chapel Hill (USA). Dept. of Chemistry
Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986, 8:44350 (R;US)

Theoretical model for the luminescing excited states of Ru(bpy)$_3^{2+}$ and Os(bpy)$_3^{2+}$ (bpy = 2,2'-bipyridine), 8:44334 (R;US)

Northern Research and Engineering Corp., Woburn, MA (USA)
R & D for improved efficiency small steam turbines. Final technical report. Phases I and II, 8:44464 (R;US)

Northwestern Univ., Evanston, IL (USA)
Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983, 8:44132 (R;US)

Northwestern Univ., Evanston, IL (USA). Dept. of Civil Engineering
Modelling and control of blackwater treatment in coal preparation, 8:43254 (R;US)

Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering
Selection of slip systems in low-temperaure deformation of niobium, 8:44128 (R;US)

Northwestern Univ., Evanston, IL (USA). Mineral Resources Engineering and Management Program
Drilling and blasting techniques and costs for strip mines in Appalachia, 8:43250 (R;US)

Nuclear Regulatory Commission, Arlington, TX (USA). Region IV
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8:43821 (R;US)

Nuclear Regulatory Commission, Washington, DC (USA). Div. of Technical Information and Document Control
Nuclear Regulatory Commission Issuances. Volume 16, No. 3, 8:43824 (R;US)

Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Material Safety and Safeguards
Final Environmental Statement related to the decommissioning of the Rare Earths Facility, West Chicago, Illinois. Docket No. 40-2061, 8:44756 (R;US)

Nuclear Regulatory Commission, Washington, DC (USA). Office of Nuclear Reactor Regulation
Draft environmental statement related to steam-generator repair at Point Beach Nuclear Plant, Unit No. 1. Docket No. 50-266, 8:43876 (R;US)
Integrated Plant Safety Assessment: Systematic Evaluation Program. Millstone Nuclear Power Station, Unit 1, Northeast Nuclear Energy Company, Docket No. 50-245. Final report, 8:43930 (R;US)
Integrated Plant Safety Assessment: Systematic Evaluation Program. Haddam Neck Plant, Connecticut Yankee Atomic Power Company, Docket No. 50-213. Final report, 8:43932 (R;US)
Integrated Plant Safety Assessment: Systematic Evaluation Program. Yankee Nuclear Power Station, Yankee Atomic Electric Company, Docket No. 50-29. Final report, 8:43931 (R;US)
Safety-evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444, 8:43933 (R;US)

Nuclear Regulatory Commission, Washington, DC (USA). Office of Resource Management
Regulatory licensing status summary report. Nuclear power plants data for decisions (Blue Book), June 1-June 30, 1983, 8:43823 (R;US)
Systematic Evaluation Program. Status summary report, 8:43822 (R;US)

Nuclear Regulatory Commission, Washington, DC (USA). Office of State Programs
Information report on state legislation, 8:43365 (R;US)

NUCLEN, Rio de Janeiro (Brazil)
Design and analysis for piping systems, 8:43856 (R;BR)
Design concept for vessels and heat exchangers, 8:44383 (R;BR)

O

Oak Ridge Associated Universities, Inc., TN (USA)
Prospects and opportunities for nuclear power regulatory reform, 8:43825 (R;US)
Safety considerations for light-water-reactor nuclear power plants: a Swedish perspective, 8:43947 (R;US)
Training Kentuckians for industrial jobs: a longitudinal study, 8:45287 (R;US)

Oak Ridge National Lab., TN (USA)
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8:43185 (R;US)
Carbon in live vegetation of major world ecosystems, 8:44710 (R;US)
Characterization of hydrofracture grouts for radionuclide migration, 8:43374 (R;US)
Data base for a site-specific analysis of the dispersion of radioactive elements from a final repository, 8:43399 (TG;US)
Design of the Advanced Toroidal Facility (ATF-1), 8:45199 (R;US)
Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982, 8:43785 (R;US)
FED-A, an advanced performance FED based on low safety factor and current drive, 8:45256 (R;US)
Hydrogen in MgO crystals thermochemically reduced at very high temperatures, 8:44261 (R;US)
Invasion of fossil-fuel CO_2 into the ocean, 8:44729 (R;US)
KWIC Index for Numerical Linear Algebra, 8:45305 (R;US)
Licensee Event Report (LER) compilation for month of June 1983, 8:43934 (R;US)
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8:44242 (R;US)
Model for pneumatic pellet injection, 8:45257 (R;US)
Model for the dispersal of seeds by animals, 8:44713 (R;US)
Neutron spectral characterization of the fourth Nuclear Regulatory Commission Heavy Section Steel Technology IT-CT irradiation experiments: dosimetry and uncertainty analysis, 8:43786 (R;US)
Oak Ridge Research Reactor quarterly report, October, November and December 1982, 8:43893 (R;US)
Potential ecological hazards of H-Coal liquefaction, 8:43222 (R;US)
Potentially damaging failure modes of high- and medium-voltage electrical equipment, 8:44452 (R;US)
Proceedings of the 1982 integrated data users workshop, 8:45321 (R;US)
Radiative decay of surface plasmons on nonspherical silver particles, 8:44837 (R;US)
Radon dosimetry: a review of radon and radon daughter exposure conditions in dwellings and other structures, 8:44706 (R;US)
Repair and cell cycle response in cells exposed to environmental biohazards. Progress report, 1 June 1982-31 May 1983, 8:44788 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 1. Control modules, 8:43408 (R;US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 2. Functional modules, 8:43409 (R;US)
Simulation of inertial and beam-driven effects on impurities in tokamak plasmas, 8:45147 (R;US)
Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts, 8:44026 (R;US)
TEDIT, a computer code for studying the time evolution of drift instabilities in a torus, 8:45146 (R;US)
UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems, 8:45057 (TG;US)
Workshop on environmental control technology for coal gasification, 8:43225 (R;US)

Oak Ridge Y-12 Plant, TN (USA)
Determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions by potentiometric titration, 8:44328 (R;US)
Procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of the CPT-8000/8100 word processor, 8:45318 (R;US)
Remote data acquisition and storage of periodic liquid uranium hexafluoride assay enrichments, 8:43413 (R;US)

Ocean Research Consultants, La Jolla, CA (USA)
Long-term trends in dynamic height and sea surface temperature, 8:44727 (R;US)

Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H.
Control of the ASTRA decay heat removal system, 8:43895 (R;AT;In German)

Use of 'Direct File Organization' for 'Current Awareness'-Services, 8:45322 (R;AT;In German)
Oesterreichisches Forschungszentrum Seibersdorf G.m.b.H., Vienna
LWR loss of coolant accidents and conservatism in the anticipated release of iodine, 8:43946 (R;AT;In German)
Office of Technology Assessment (U.S. Congress), Washington, DC
Informational technology and its impact on American education, 8:44119 (R;US)
Ohio State Univ., Columbus (USA)
Nuclear-fuel-cycle education: Module 9. Safeguards, 8:43402 (R;US)
Nuclear-fuel-cycle education: Module 8. Waste management, 8:43345 (R;US)
Oregon State Univ., Corvallis (USA). Clark Meat Science Lab.
Development of a commercial feasible application of a hydrostatic meat tenderizer and demonstration of its efficacy. Final report, June 24, 1980-March 1, 1983, 8:44095 (R;US)
Osaka Univ., Suita (Japan). Inst. of Laser Engineering
Characteristics of transported ion beam in laser-initiated plasma channels, 8:45110 (R;JP)
Finite size fluid particle in nonuniform moving grid, 8:45111 (R;JP)
Measurements of ablation pressure and mass ablation rate using a target pendulum and a thin foil target at 10 μm laser wavelength, 8:45226 (R;JP)
Numerical calculations of the ray trace, absorption distribution and absorption efficiency of the laser beam in spherical symmetric plasmas, 8:45228 (R;JP)
Pulse propagation properties in high-power CO_2 laser system for laser fusion, 8:45227 (R;JP)

P

Pacific Energy Technology, Inc., Sausalito, CA (USA)
Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982, 8:44051 (R;US)
Pacific Gas and Electric Co., San Ramon, CA (USA)
Simplified contacting scheme for GaAs solar cells using silver, 8:43509 (R;US)
Pacific Northwest Lab., Richland, WA (USA)
Aging test results of an asphalt membrane liner, 8:43346 (R;US)
Analytical assumptions and causal ordering in interindustry modeling, 8:43989 (R;US)
Background radioactivity from natural occurrences: a preliminary review, 8:44717 (R;US)
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8:44759 (R;US)
Chemical and mutagenic characteristics of diesel-exhaust particles from different diesel fuels, 8:44687 (R;US)
Comparison of occupational dose estimates for TMI-2 recovery operation, 8:43787 (R;US)
Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation, 8:43756 (R;US)
Determination of important physicochemical processes at an aquifer thermal-energy-storage site in Minnesota using both laboratory and field techniques, 8:43973 (R;US)
Effects of O_2 addition on the growth of columnar shadowing defects in sputtered Ni, 8:44194 (R;US)
Experiment operations plan for the MT-3 experiment in the NRU reactor, 8:43937 (R;US)
Experimental investigation of interfacial shear in large-particle-coal hydrotransport, 8:43255 (R;US)
Fly ash and coal mineral matter transformations during heating, 8:43193 (R;US)
Ground-water surveillance at the Hanford Site for CY 1982, 8:44748 (R;US)
Information manual for the institutional conservation program, 8:44085 (R;US)
Institutional implications of establishing safety goals for nuclear power plants, 8:43940 (R;US)
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model, 8:44431 (R;US)
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 2. Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8:44432 (R;US)
Making use of wind energy: a course in evaluating and choosing sites for small wind machines, 8:43719 (R;US)
Measurements of gamma-ray dose from a moderated ^{252}Cf source, 8:45059 (R;US)
Modelling and control of blackwater treatment in coal preparation, 8:43254 (R;US)
Neutron-activation analysis in vivo, 8:44776 (R;US)
New decontamination techniques for exposure reduction, 8:43376 (R;US)
Nuclear power attitude trends, 8:43949 (R;US)
Probabilistic analysis of alternative strategies for US FBR development, 8:43813 (R;US)
Proceedings of the 15th biomass thermochemical conversion contractor's meeting, 8:43425 (R;US)
Reclaiming mined lands in arid environments, 8:43252 (R;US)
Results of recent research on aquifer thermal-energy-storage technical issues, 8:43974 (R;US)
Selenium sorption on a Columbia River basalt, 8:44819 (R;US)
Tailings treatment techniques for uranium mill waste: a review of existing information, 8:43366 (R;US)
Thermal release of volatile fission products from irradiated nuclear fuel, 8:43375 (R;US)
Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation, 8:43948 (R;US)
Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8:44786 (R;US)
Transportation packaging for processed transuranic waste, 8:43333 (R;US)
TRAN-STAT: statistics for environmental studies, 8:45306 (R;US)
TRAN-STAT: statistics for environmental studies, No. 18, January 1982, 8:45307 (R;US)
TRAN-STAT: (statistics for environmental studies), Number 23, April 1983, 8:44718 (R;US)
TRAN-STAT (statistics for environmental studies) Number 20, May 1982, 8:45308 (R;US)
Paraiba Univ., Joao Pessoa (Brazil)
Optimization of mechanical systems subjected to dynamic loadings, 8:44379 (R;BR)
Paris-11 Univ., 91 - Orsay (France)
Temperature effects studies in light water reactor lattices, 8:43767 (R;FR;In French)
Pennsylvania State Univ., University Park (USA)
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8:43829 (R;US)
Pennsylvania State Univ., University Park (USA). Coal Research Section
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8:43164 (R;US)
Pennsylvania State Univ., University Park (USA). Dept. of Materials Science and Engineering
Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel, 8:44262 (R;US)
Grain boundary and surface diffusion in oxide systems. Technical progress report, 8:44243 (R;US)
Perkin-Elmer Corp., Norwalk, CT (USA). Electro-Optical Div.
X-ray microscope design study. Final report, 8:44644 (R;US)
Piaui Univ., Teresina (Brazil). Dept. de Estruturas
Lower bounds of collapse loads in axisymmetrical vessels, 8:44380 (R;BR;In Portuguese)
Pittsburgh Univ., PA (USA). Dept. of Chemical and Petroleum Engineering
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8:43148 (R;US)
Planning and Management Associates of Greater Washington, Inc., DC (USA)
Active solar heating-and-cooling system-development projects, 8:43638 (R;US)
US Department of Energy Passive and Hybrid Solar Energy Program update meeting, 8:43548 (R;US)
Politecnico di Torino (Italy)
Slow forced and free convection in inclined channels, 8:44415 (R;BR)
Two-phase flow and heat transfer in cavities, 8:44410 (R;BR)
Pontificia Univ. Catolica do Rio de Janeiro (Brazil)
Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle, 8:44422 (R;BR;In Portuguese)

Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor, 8:43772 (R;BR;In Portuguese)
Transients in pipes, 8:44411 (R;BR)
Use of the strength ratio for pre-cracked Charpy specimens for the measuring, of the dynamic toughness of steels, 8:44140 (R;BR;In Portuguese)
Princeton Univ., NJ (USA). Plasma Physics Lab.
Current-drive experiments on the PLT Tokamak, 8:45148 (R;US)
Echo phenomenon associated with lower-hybrid-wave launching, 8:45150 (R;US)
Lower-hybrid current drive with opposing ohmic drive on PLT, 8:45152 (R;US)
Plasma rotation in the PDX tokamak, 8:45151 (R;US)
Population inversion and gain measurements for soft x-ray-laser development in a magnetically confined plasma column, 8:44400 (R;US)
Topics in the theory of statistical closure approximations for plasma physics, 8:45149 (R;US)
Public Service Co. of New Mexico, Albuquerque (USA)
End-use research status report, April 1, 1983-June 30, 1983, 8:43644 (R;US)
Purdue Univ., Lafayette, IN (USA). School of Civil Engineering
Heuristic method for measurement and characterization of river meander wavelength, 8:44814 (R;US)
Putnam, Hayes and Bartlett, Inc., Cambridge, MA (USA)
Alternative energy futures: a review of low-energy-growth forecasts and least-cost planning studies, 8:44028 (R;US)

Q

QEB, Inc., Lakewood, CO (USA)
Airborne gamma-ray spectrometer and magnetometer survey, Dryden, Texas; Indian Wells, Texas. Volume I. Detail area. Final report, 8:43312 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report, 8:43314 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area, 8:43315 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area, 8:43316 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area, 8:43319 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II A. Detail area, 8:43320 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area, 8:43321 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area, 8:43322 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area, 8:43323 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report, 8:43324 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area, 8:43317 (R;US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area, 8:43318 (R;US)

R

Radian Corp., Durham, NC (USA)
Preliminary study of sources of inorganic arsenic, 8:44665 (R;US)
Radian Corp., McLean, VA (USA)
Scale-up procedures for a Scheibel extraction column, 8:43218 (R;US)
Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research
Building energy code input form with instructions for completion, 8:44068 (R;US)
Building energy performance standards. Phase IV. Code parameter list and code format listing, 8:44070 (R;US)
Development of a building energy-code input form, 8:44072 (R;US)
Evaluation of building-code descriptors, 8:44071 (R;US)
Rensselaer Polytechnic Inst., Troy, NY (USA). Plasma Dynamics Lab.
Space potential, temperature, and density profile measurements on RENTOR, 8:45101 (R;US)
Research Triangle Inst., Research Triangle Park, NC (USA)
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8:43217 (R;US)
Rijksuniversiteit Leiden (Netherlands). Kamerlingh Onnes Lab.
Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands, 8:44908 (R;NL)
Rio de Janeiro Univ. (Brazil). Coordenacao dos Programas de Pos-graduacao de Engenharia
Davies-Taylor equation for the fluidization bubble, 8:44419 (R;BR)
Energy supply and the swelling in solid fuels, 8:43865 (R;BR;In Portuguese)
Probabilistic safety analysis : a new nuclear power plants licensing method, 8:43953 (R;BR;In Portuguese)
Risoe National Lab., Roskilde (Denmark)
Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air, 8:44688 (R;DK)
Magnesium hydride for load-leveling energy storage. Final report, 8:43420 (R;XE)
Test of Tripod datalogger, 8:43720 (R;DK;In Danish)
Write-up for the diffractometer D1 at Risoe, 8:44640 (R;DK)
Rochester Univ., NY (USA). Coll. of Engineering and Applied Science
LLE Review. Quarterly report, July 1982-September 1982, 8:45212 (R;US)
Rochester Univ., NY (USA). Lab. for Laser Energetics
Crystal-diffraction system for spectroscopy, imaging, and interferometry of inertially confined fusion targets. Final report for the period ending January 1, 1983, 8:45213 (R;US)
Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant
Characteristics of transuranic waste at Department of Energy sites, 8:43377 (R;US)
Method for treating solid substances in original water, 8:44746 (TG;US)
Process for recovering uranium contained in phosphate compounds, 8:43326 (TG;US)
Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations
Drilling history of core hole DB-15, 8:43379 (R;US)
Performance allocation traceable to regulatory criteria as applied to site-characterization work at the Basalt Waste Isolation Project, 8:43378 (R;US)
Rogers, Golden and Halpern, Inc., Philadelphia, PA (USA)
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8:44040 (R;US)
Royal Inst. of Tech., Stockholm (Sweden). Plasma Physics and Fusion Research
Toroidal Extrap Equilibria, 8:45258 (R;SE)
Ruhrkohle A.G., Essen (Germany, F.R.)
New solution of energy problems for industrial operation by cogeneration, 8:44093 (R;DE;In German)

S

Salt River Project, Phoenix, AZ (USA)
Salt River Project South Consolidated Hydroelectric Generating Station. DOE Small-Scale Hydroelectric Demonstration

Program. First annual operating report, September 1, 1981 to August 31, 1982, 8:43476 (R;US)

Sanders Associates, Inc., Nashua, NH (USA). Energy Systems Center
1/4-megawatt solar receiver. Final report, 8:43535 (R;US)

Sandia National Labs., Albuquerque, NM (USA)
Accelerated aging of Wahl Temp-Plate temperature-recording devices, 8:44642 (R;US)
Comparison of analytical models and experimental results for single-event upset in CMOS SRAMs, 8:44628 (R;US)
Dynamic instability in adiabatic thermoplastic shear, 8:44196 (R;US)
Error analysis of thermocouple measurements in the Climatic Facility, 8:44643 (R;US)
Evaluation of severe accident safety system value based on averting financial risks, 8:43950 (R;US)
Forced ventilation analysis of a commercial high-level nuclear waste repository in tuff. Topical report RSI-0175, 8:43382 (R;US)
Generic evaluation of the radiological impacts of transportation in the nuclear fuel cycle, 8:43334 (R;US)
Heuristic method for measurement and characterization of river meander wavelength, 8:44814 (R;US)
High-energy gas-fracturing develpoment. Annual report, April 1982-March 1983, 8:43296 (R;US)
Hydrology of sealing a repository in saturated tuff, 8:43386 (R;US)
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8:44197 (R;US)
Insulation-resistance measurements of coated and uncoated printed wiring boards, 8:44453 (R;US)
Intermediate velocity penetration of steel spheres into deep aluminum targets, 8:44195 (R;US)
Light-Water-Reactor Safety-Technology Program. Quarterly report, January-March 1983, 8:43951 (R;US)
Measuring stiffness, 8:45311 (R;US)
Metacad programmer's guide, 8:45310 (R;US)
Microstructural characterization of simulated reactor waste forms, 8:43381 (R;US)
Modal identification of a rotating-blade system, 8:43721 (R;US)
Modeling and analysis of drag-bit cutting, 8:43665 (R;US)
Monte Carlo simulation of shock-induced lattice damage, 8:45066 (R;US)
Nonhydrostatic effects in stress-wave induced phase transformation of calcite, 8:44284 (R;US)
Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8:43305 (R;US)
Petrographic study of evaporite deformation near the Waste Isolation Pilot Plant (WIPP), 8:43385 (R;US)
Post-shock chemical and ESR analysis of acrylamide and selected anthracene derivatives, 8:44351 (R;US)
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8:43384 (R;US)
Radiation-hard design principles utilized in CMOS 8085 microprocessor family, 8:44393 (R;US)
SNAP-BACK: a stable regenerative breakdown mode of MOS devices, 8:44627 (R;US)
Stresses near waste canisters buried in salt, 8:43383 (R;US)
Subseabed Disposal Program In-Situ Heat Transfer Experiment (ISHTE), 8:43380 (R;US)
Systems approach to measuring short-duration acceleration transients, 8:44641 (R;US)
The benchmarking of RADTRAN II, 8:43335 (R;US)
Theory of dephasing of impurities in glasses, 8:44285 (R;US)
Thermal/Hydraulic Analysis Research Program. Quarterly report, July-September 1982, 8:43938 (R;US)
Transient response of GaAs microwave power FET to x-ray pulses, 8:44626 (R;US)
Truck transportation of radioactive materials, 8:43336 (R;US)

Sandia National Labs., Livermore, CA (USA)
DIFFUSE 83, 8:45312 (R;US)

Santa Catarina Univ., Florianopolis (Brazil). Dept. de Engenharia Mecanica
Analysis of the flow close to a hump at the wall of a circular pipe, 8:44907 (R;BR;In Portuguese)
Mathematical model for the calculation of internal turbulent flow, 8:44906 (R;BR;In Portuguese)
Plastic instability in short tubes with internal pressure, 8:44381 (R;BR;In Portuguese)
Simulation of gas compressible flow by free surface water flow, 8:44905 (R;BR;In Portuguese)

Sao Carlos Univ. (Brazil)
Utilization of axisymmetrical models in the description of the fluctuating temperature field and in the calculation of turbulent thermal diffusivity, 8:44421 (R;BR;In Portuguese)

Sao Paulo Univ. (Brazil)
Method for the dimensioning of a cantileva-beam submitted to aleatory effects, 8:44141 (R;BR;In Portuguese)

Saskatchewan Research Council, Saskatoon (Canada)
Problem of abandoned uranium tailings in northern Saskatchewan. An overview, 8:43395 (R;CA)

Science Applications, Inc., Bethesda, MD (USA)
Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8, 8:43757 (R;US)

Science Applications, Inc., Schaumburg, IL (USA)
Power-line-induced AC potential on natural-gas-pipelines for complex rights-of-way configurations. Volume 3. Computer program user's guide. Final report, 8:43298 (R;US)

Science Research Council, Chilton (UK). Rutherford and Appleton Labs.
High resolution energy analysers for the 'High Throughput Inelastic Spectrometer', 8:44622 (R;GB)
In vivo imaging of the human thyroid with the Rutherford positron camera using ^{124}I, 8:44777 (R;GB)
PIPIN users guide: a users guide to the omicron Data Aquisition system, 8:44623 (R;GB)

Sentralinstitutt for Industriell Forskning, Oslo (Norway)
Chemical characterization of emmissions from wood-fired stoves, 8:43510 (R;NO;In Norwegian)
Well control in case of offshore blowout. Capping on the sea floor, blowout risk of subsea oil production, 8:43282 (R;NO)
Well control in case of offshore blowout. Diversion, 8:43278 (R;NO)
Well control in case of offshore blowout. Mechanized drill pipe handling, stabbing, stripping/snubbing, drill string telemetry and mud monitoring, better BOP, 8:43280 (R;NO)
Well control in case of offshore blowout. Oil collection on platforms, 8:43279 (R;NO)
Well control in case of offshore blowout. Well killing-final control-after shut-in in relation to the various control methods, 8:43281 (R;NO)

Shell Austria A.G., Vienna
Aviation fuels - today and tomorrow, 8:44091 (R;DE;In German)

Shell Switzerland, Zurich
Aviation fuels - today and tomorrow, 8:44091 (R;DE;In German)

Skoda, Plzen (Czechoslovakia). Zavod Vystavba Jadernych Elektraren
Measured spectra of neutrons escaping from iron spheres, 8:43852 (R;CS)

Societe Bertin et Compagnie, 78 - Plaisir (France)
CO_2-based ventilation in buildings, 8:44080 (R;XE;In French and English)

Solar Energy Research Inst., Golden, CO (USA)
Alcohol fuels activities at the Solar Energy Research Institute, 1982, 8:44052 (R;US)
High-temperature acid hydrolysis of cellulose for alcohol fuel production, 8:43454 (R;US)
Performance prediction of attached sunspaces, 8:43645 (R;US)
Photovoltaic energy systems. Program summary, fiscal year 1982, 8:43491 (R;US)
Review of research on polycrystalline-silicon solar cells, 8:43508 (R;US)
Simplified contacting scheme for GaAs solar cells using silver, 8:43509 (R;US)
Solar energy quick reference guide, 8:43481 (R;US)
Wind-energy systems for electric utilities: a synthesis of value studies, 8:43678 (R;US)

Southwest Research Inst., San Antonio, TX (USA)
Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends, 8:44127 (R;US)

Spectrolab, Inc., Sylmar, CA (USA)
Design, analysis, and test verification of advanced encapsulation systems. Triannual report for period ending 31 March 1983, 8:43494 (R;US)
Development of metallization process: FSA project, cell and module formation research area. Quarterly technical progress report No. 6329-12 for the period ending March 31, 1983, 8:43496 (R;US)

SRI International, Menlo Park, CA (USA)
Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8:43170 (R;US)
Staatliches Amt fuer Atomsicherheit und Strahlenschutz, Berlin (German Democratic Republic)
Method for unfolding high-energy scintillation gamma-ray spectra up to 8 MeV, 8:45309 (R;DD;In German)
Sample size optimization in nuclear material control. 1. Random sampling for the variables test, 8:43411 (R;DD;In German)
Sample size optimization in nuclear material control. 2. Random sampling for the attribute test, 8:43412 (R;DD;In German)
Stanford Linear Accelerator Center, CA (USA)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part II. Checking the method by a quadrupole pertubation, 8:44504 (R;US)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part III. Beam-size enhancement due to the presence of nonlinear magnets in a ring, 8:44507 (R;US)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part I. The Green's function for the Fokker-Planck equation, 8:44560 (R;US)
Closed orbit produced by an imperfect bump, 8:44501 (R;US)
Evaluation of the beam-beam effect in PEP using Myer's simulation program, 8:44503 (R;US)
Handy impedance formulae, incoherent synchrotron frequency, and head-tail tune shift in PEP, 8:44505 (R;US)
Heat flow in a He II-filled fin, 8:44434 (R;US)
Ideal of the perfect magnet-superconducting systems, 8:44554 (R;US)
Personnel neutron dosimetry at SLAC, 8:45060 (R;US)
Single-bunch beams for BC-75, 8:44479 (R;US)
Stanford Linear Accelerator Center monthly report for October 1982, 8:44515 (R;US)
Stanford Linear Accelerator Center monthly report for May 1982, 8:44518 (R;US)
Stanford Linear Accelerator Center monthly report for November 1982, 8:44519 (R;US)
Stanford Linear Accelerator Center monthly report for September 1982, 8:44520 (R;US)
Stanford Linear Accelerator Center monthly report for June 1982, 8:44516 (R;US)
Stanford Linear Accelerator Center monthly report for December 1982, 8:44517 (R;US)
Threshold current for the transverse single-bunch instability in PEP, 8:44502 (R;US)
Verification of the SLC wake potentials, 8:44506 (R;US)
Stanford Univ., CA (USA). Dept. of Operations Research
Combinatorial approach to some sparse-matrix problems, 8:45313 (R;US)
Stanford Univ., CA (USA). Edward L. Ginzton Lab.
Laser techniques for extreme-ultraviolet spectroscopy, 8:44631 (R;US)
Statens Naturvaardsverk, Stockholm (Sweden)
Hydrological environmental consequences of peat extraction. Preliminary study, 8:43242 (R;SE;In Swedish)
Statens Provningsanstalt, Boraes (Sweden)
Thermal performance of solar collectors. Three years of outdoor exposure of eleven different products, 8:43647 (R;SE;In Swedish)
Statens Vattenfallsverk, Vaellingby (Sweden)
Determination of the state of stress at the Stripa Mine, Sweden, 8:43363 (R;US)
Statens Vattenfallsverk, Vaellingby (Sweden). Projekt KOL-HAELSA-MILJOE
Toxicity studies of mercury in Japan, 8:44743 (R;SE;In Swedish)
State Univ. of New York, Stony Brook (USA)
Construction and maintenance of SUNY facilities at the National Synchrotron Light Source. Progress report, 1 July 1982-1 July 1983, 8:44514 (R;US)
State Univ. of New York, Stony Brook (USA). Research Foundation
Research on surface physics and crystallography at NSLS. Technical progress report, 1 November 1982-31 October 1983, 8:45063 (R;US)
Stichting Energieonderzoek Centrum Nederland, Petten. Bureau Energie Onderzoek Projekten
Calculation method of the power generation costs of a nuclear power plant, 8:44019 (R;NL;In Dutch)
Coal exploration in the Netherlands. A research proposal, 8:43243 (R;NL;In Dutch)
Description of SELPE, a model of the Dutch energy supply, 8:44030 (R;NL;In Dutch)
Determination of environment parameters for SELPE, a model for energy supply, 8:43984 (R;NL;In Dutch)
Electric power production data bank: construction and some details, 8:44043 (R;NL;In Dutch)
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households, 8:44115 (R;NL;In Dutch)
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households. Summary, 8:44116 (R;NL;In Dutch)
Energy conservation in buildings, 8:44077 (R;NL;In Dutch)
Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8:44117 (R;NL;In Dutch)
Energy from Meuse and Rhine. A systematic analysis, 8:43542 (R;NL;In Dutch)
Energy prices and employment, 8:43988 (R;NL;In Dutch)
Industrial fuel applications. Furnaces and dryers, 8:44099 (R;NL;In Dutch)
Industrial fuel use in relation to temperature, 8:44046 (R;NL;In Dutch)
Measurement of the Cp-lambda curve of wind turbines under field conditions, 8:43715 (R;NL;In Dutch)
National development program Wind energy. Proposal for the years 1981 to 1990, 8:43667 (R;NL;In Dutch)
National Research Program Solar Energy. Progress report for the period ending 30 June 1979, 8:43478 (R;NL;In Dutch)
Perspectives for wind energy in the Netherlands. National research programme 1976-1981. Results and recommendations, 8:43666 (R;NL;In Dutch)
Proposed coordinated research program of energy storage in flywheels. Project preparation group 'Flywheels', 8:43970 (R;NL;In Dutch)
Regulations for wind turbines. Inventory and proposals, 8:43677 (R;NL;In Dutch)
Research program of energy storage in flywheels. Results and recommendations, 8:44010 (R;NL;In Dutch)
Review of energy storage, 8:43968 (R;NL;In Dutch)
Risks of energy systems, 8:44007 (R;NL;In Dutch)
SO2-, NOx- and dust-emissions in the energy model SELPE: an integrated energy/environmental model, 8:44006 (R;NL;In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1980, 8:43544 (R;NL;In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1981, 8:43545 (R;NL;In Dutch)
Temperatures of industrial process heat, 8:44098 (R;NL;In Dutch)
The National Research Program Solar Energy. Project overview first phase (1978-1981), 8:43477 (R;NL;In Dutch)
The social network approach to increase energy conservation: theoretical backgrounds, 8:44118 (R;NL;In Dutch)
Weight and cost analysis of large wind turbine rotors constructed from conventional materials and from advanced composite materials, 8:43714 (R;NL;In Dutch)
Wind energy in the Netherlands, 8:43668 (R;NL)
Stichting Energieonderzoek Centrum Nederland, The Hague
Annual report 1981, 8:44012 (R;NL;In Dutch)
Stichting voor Fundamenteel Onderzoek der Materie, Jutphaas (Netherlands). Inst. voor Plasma-Fysica
Comparison of two approaches for solving equilibrium problems for axisymmetric current-carrying plasmas, 8:45153 (R;NL)
Ideal MHD equilibrium of a weakly toroidal plasma column with elongated cross-section. Part 3: Non-elliptical cross-section and summary, 8:45154 (R;NL)
Stiftelsen foer Vaermeteknisk Forskning, Stockholm (Sweden)
Proposals for acoustical requirements of the heating and power industry, 8:44812 (R;SE;In Swedish)
Stiftelsen foer Vaermeteknisk Forskning, Studsvik (Sweden)
Metallographical methods for observation of creep cavities in service exposed low alloyed steel, 8:44198 (R;SE)
NO sub (x) formation from different coal types in a bench scale reactor under excess air and staged combustion conditions. Final report, 8:43264 (R;SE)
Reduction of organic matter in macroporous weak anion exchanger and scavenger filter. Field studies, 8:44745 (R;SE;In Swedish)

Stockholm Univ. (Sweden). Fysiska Institutionen
Some comments on the WEC energy demand model, 8:43985 (R;SE)
Strasbourg-1 Univ., 67 (France)
Accelerating field spectrometer for photons and electrons simultaneous measurement. Application to decay schemes study, 8:44564 (R;FR;In French)
Studsvik Science Research Lab., Nykoeping (Sweden)
Neutron elastic scattering in the energy region 1.5 to 4.0 MeV for radiogenic lead and bismuth, 8:45015 (R;SE)
Stuttgart Univ. (Germany, F.R.). Inst. fuer Kernenergetik und Energiesysteme
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8:43911 (R;DE;In German)
Styrelsen foer Teknisk Utveckling, Stockholm (Sweden)
Ventilation in connection with vacuum impregnation. The construction of an impregnation plant with a good working environment and energy saving for the impregnation of wood, 8:44689 (R;SE;In Swedish)
Sundstrand Corp., Rockford, IL (USA). Sundstrand Energy Systems
Analysis and reduction of degradation of working fluid in the Sundstrand Organic Rankine-Cycle System, 8:44097 (R;US)
Svensk Kaernbraenslefoersoerjning AB, Stockholm
Water inflow into boreholes during the Stripa heater experiments, 8:43362 (R;US)
Sveriges Meteorologiska och Hydrologiska Inst., Norrkoeping
Classification of the wind of two areas in the district of Halland, 8:43717 (R;SE;In Swedish)
Synectics Group, Inc., Washington, DC (USA)
Manager's guide to successful energy conservation, 8:44060 (R;US)

T

Technische Hochschule Aachen (Germany, F.R.)
Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors, 8:43791 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Bergbau und Huettenwesen
Development of the seam, 8:43251 (R;DE;In German)
Experimental studies on drilling with roller bits in a deep-drilling test bench at a rotational speed of 50 min^{-1} to 150 min^{-1}, 8:44391 (R;DE;In German)
Experiments and model calculations on pyrolysis and gasification of Rhenish lignite in an inclined revolving pipe, 8:43183 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Fakultaet fuer Maschinenwesen
Contribution to the dynamic behaviour of steam power plants, 8:43733 (R;DE;In German)
Technische Hochschule Aachen (Germany, F.R.). Mathematisch-Naturwissenschaftliche Fakultaet
Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District, 8:43192 (R;DE;In German)
Technische Hochschule Darmstadt (Germany, F.R.). Fachbereich Elektrische Enerkgietechnik
Calculation of reliability characteristics for electric power supply networks, 8:43738 (R;DE;In German)
Corrective switching, 8:43740 (R;DE;In German)
Technische Hochschule Darmstadt (Germany, F.R.). Fachgebiet Reaktortechnik
Investigations by model theory of fast breeder reactor fuel pins and application to special safety experiments, 8:43928 (R;DE;In German)
Technische Univ. Braunschweig (Germany, F.R.). Fakultaet fuer Maschinenbau und Elektrotechnik
Application of process computers for cost-optimal control in power networks, 8:43741 (R;DE;In German)
Influence of hydrogen on pure iron and steel at medium and high pressure levels, 8:44174 (R;DE;In German)
Investigations on operational behaviour of hybrid cooling towers, 8:43731 (R;DE;In German)
Technische Univ. Muenchen (Germany, F.R.). Fakultaet fuer Maschinenwesen
Influence of air flow inside the combustion space on the exhaust emissions of a direct-injection diesel engine, 8:44122 (R;DE;In German)
Tekniska Hoegskolan, Lund (Sweden). Institutionen foer Teknisk Vattenresurslaera
Preparatory investigation for geothermal heat pump plant in the commune of Landskrona, 8:43657 (R;SE;In Swedish)
Tennessee Univ., Oak Ridge (USA). Graduate School of Biomedical Sciences
Repair and cell cycle response in cells exposed to environmental biohazards. Progress report, 1 June 1982-31 May 1983, 8:44788 (R;US)
Texas A and M Univ., College Station (USA). Cyclotron Inst.
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8:44838 (R;US)
Texas Univ., Austin (USA). Inst. for Fusion Studies
Heat conduction process in tokamak hot-ion plasmas, 8:45102 (R;US)
Thermo Electron Corp., Waltham, MA (USA)
Chlorine-extraction processes for energy-conserving recovery of nonferrous metals, 8:44104 (R;US)
Titograd Univ. (Yugoslavia)
Thermodynamic analysis of elastic-plastic deformation, 8:45080 (R;BR)
Tokyo Univ., Tanashi (Japan). Inst. for Nuclear Study
Proceedings of symposium on inertial fusion with heavy ion beam, 8:44878 (R;JP)
Tokyo Univ., Tokai, Ibaraki (Japan). Nuclear Engineering Research Lab.
Report of study meeting on heat transfer and structure problems in nuclear facilities, 1979, 8:45269 (R;JP;JA)
Tracer Technologies, Inc., Newton, MA (USA)
Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios, 8:44324 (R;US)
Trent Univ., Peterborough, Ontario (Canada)
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8:44977 (R;US)
Triangle Universities Nuclear Lab., Durham, NC (USA)
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8:44977 (R;US)
Trieste Univ. (Italy). Ist. di Fisica Teorica
Study of an F center in molten KCl, 8:44358 (R;US)
TRW Defense and Space Systems Group, Redondo Beach, CA (USA). Fluid Thermochemistry Dept.
Coal pyrolysis under rapid heating with a c-w laser, 8:43161 (R;US)
Turlock Irrigation District, CA (USA)
Small-Scale Hydroelectric Power Demonstration Project: Turlock Irrigation District Drop No. 1 power plant. Final technical and construction cost report, 8:43475 (R;US)

U

UKAEA Atomic Energy Establishment, Winfrith
Cement radwaste solidification studies. Third annual report, 8:43339 (R;GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description, 8:43897 (R;GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes, 8:43898 (R;GB)
UK MT-3 ballooning test in the Battelle NRU loop, 8:43896 (R;GB)
Winfrith PVT Package, 8:43291 (R;GB)
UKAEA Atomic Energy Research Establishment, Harwell
Nuclear-fuel-cycle education: Module 8. Waste management, 8:43345 (R;US)
UKAEA Atomic Energy Research Establishment, Harwell. Materials Development Div.
Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution, 8:43340 (R;GB)

UKAEA Risley Nuclear Power Development Establishment
Denitration of simulated fast reactor highly active liquor waste, 8:43364 (R;GB)
PWR degraded core analysis, 8:43929 (R;GB)
UNC Nuclear Industries, Inc., Richland, WA (USA)
Development of magnetic filters for the primary-coolant circuit of a PWR, 8:43788 (R;US)
United Engineers and Constructors, Inc., Philadelphia, PA (USA)
Energy Economic Data Base Program (EEDB). Phase V update (1982) report, 8:43827 (R;US)
Program reference book for the Energy Economic Data Base Program (EEDB), 8:43828 (R;US)
United Technologies Corp., South Windsor, CT (USA). Power Systems Div.
Task 4 completion report for 40-kilowatt grid-connected modification contract, 8:44056 (R;US)
United Technologies Research Center, East Hartford, CT (USA)
Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981, 8:43191 (R;US)
Universidade Estadual de Campinas (Brazil)
Design of heat exchangers by numerical methods, 8:44417 (R;BR;In Portuguese)
Experimental analytical study on heat pipes, 8:44382 (R;BR;In Portuguese)
Simulation of thermal transients using CSMP, 8:44416 (R;BR;In Portuguese)
University Coll., Cork (Ireland). Microelectronics Research Centre
AMOS solar cells on polycrystalline gallium arsenide. Final report, 8:43500 (R;XE)
University Coll., Dublin (Ireland). Dept. of Mechanical Engineering
No-coolant diesel engine, 8:44121 (R;XE)
University of Southern California, Los Angeles (USA). Center for Laser Studies
Multiple-pulse laser-induced damage in crystalline and fused quartz. Final report, 8:44263 (R;US)
University of South Florida, Tampa (USA). Dept. of Biology
Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts, 8:43286 (R;US)
Urangesellschaft m.b.H. und Co. K.G., Frankfurt am Main (Germany, F.R.)
Logistics of Australian uranium in the world market, 8:43332 (R;DE)
Uranium Information Centre Ltd., Melbourne (Australia)
Geography - outline of deposits, where they are, how much they contain, 8:43311 (R;AU)
USAEC Division of Headquarters Services, Washington, DC
Applications of nuclear and applied techniques in public health and pollution control. Proceedings, 8:44005 (R;IN)
USDOE Assistant Secretary for Management and Administration, Washington, DC. Office of the Executive Secretary
History of the Atomic Energy Commission, 8:43743 (R;US)
USDOE Bonneville Power Administration, Portland, OR
Evaluation of potential for electrical generation using solid waste as fuel in the Pacific Northwest, 8:44108 (R;US)
USDOE Energy Information Administration, Washington, DC
Domestic natural gas reserves and production dedicated to interstate pipeline companies, 1982, 8:43292 (R;US)
USDOE Energy Information Administration, Washington, DC. Office of Coal, Nuclear, Electric and Alternate Fuels
Coal distribution, January-March 1983, 8:44035 (R;US)
USDOE Energy Information Administration, Washington, DC. Office of Energy Markets and End Use
Oil market Simulation model documentation report, 8:44038 (R;US)
Short-term energy outlook. Volume 1. Quarterly projections, 8:44027 (R;US)
USDOE Energy Information Administration, Washington, DC. Office of Oil and Gas
Petroleum marketing monthly, 8:43285 (R;US)
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8:44036 (R;US)
Petroleum resources of Venezuela and Trinidad and Tobago, 8:44037 (R;US)
USDOE Grand Junction Area Office, CO (USA)
Statistical data of the uranium industry, 8:43310 (R;US)
USDOE Nuclear Waste Policy Act Project Office, Washington, DC
Report on financing the disposal of commercial spent nuclear fuel and processed high-level radioactive waste, 8:43344 (R;US)
USDOE Office of Inspector General, Washington, DC
Commercial timesharing costs at the Federal Energy Regulatory Commission, 8:45289 (R;US)
USDOE Pittsburgh Energy Technology Center, PA
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8:43148 (R;US)
USDOE Pittsburgh Naval Reactors Office, West Mifflin, PA
Quarterly operating report, first quarter 1983, 8:43764 (R;US)
Ustav Jaderneho Vyzkumu CSKAE, Rez (Czechoslovakia)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 2. Experimental study of temperature fields in fuel assembly side region at rated rod position, 8:43814 (R;CS;In Russian)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 3. Experimental study of temperature fields in fuel assembly side region at non-rated rod position, 8:43815 (R;CS;In Russian)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 4. Temperature conditions in fuel assembly with inserts in marginal cells, 8:43816 (R;CS;In Russian)

V

Valley Forge Labs., Devon, PA (USA)
Kiln dust-fly ash systems for highway bases and subbases, 8:44100 (R;US)
VAM Ltd., Melbourne (Australia)
Lake Way uranium project, 8:43308 (R;AU)
Vineta, Inc., Falls Church, VA (USA)
Review of a report Industrial Cogeneration Potential (1980 to 2000). Phase II. Peer review and application of a data base, 8:44094 (R;US)
Virginia Polytechnic Inst. and State Univ., Blacksburg (USA). Dept. of Forestry
First three years of the Department of Energy Grant. Final report, 8:43493 (R;US)
Vrije Univ., Amsterdam (Netherlands)
Some radiopharmaceuticals derived from carbon-eleven labelled phosgene. Synthesis and clinical application, 8:44770 (R;NL)

W

Waterloo Univ., Ontario (Canada). Dept. of Earth Sciences
Field assessment of the use of borehole pressure transients to measure the permeability of fractured rock masses, 8:43360 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (USA)
Brine migration test for Asse Mine, Federal Republic of Germany: final test plan, 8:43367 (R;US)
Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Energy Systems Div.
Process research of non-CZ silicon material. Low-cost solar-array project: cell and module formation research area. Quarterly report No. 5, March 1, 1983-May 31, 1983, 8:43495 (R;US)
Wisconsin Univ., Madison (USA). Solar Energy Lab.
Performance prediction of attached sunspaces, 8:43645 (R;US)
Wyoming Univ., Laramie (USA). Dept. of Geology and Geophysics
Thermopolis hydrothermal system, with an analysis of Hot Springs State Park. Preliminary report No. 20, 8:43654 (R;US)

Y

Yale Univ., New Haven, CT (USA)
Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8:44767 (R;US)
Instrument to detect vapor-nucleation in superheated liquid, 8:44567 (R;US)
Investigations on the applicability of superheated drop detectors in neutron dosimetry, 8:44568 (R;US)

Z

Zaininger Engineering Co., San Jose, CA (USA)
Investigate alternative interconnection strategies for arrays of wind-turbine generators. Final report, 8:43718 (R;US)
Zentralinstitut fuer Kernforschung, Rossendorf bei Dresden (German Democratic Republic)
Heat pipe - a heat conductor of high efficiency, 8:44435 (R;DD;In German)

PERSONAL AUTHOR INDEX

Authors' surnames are indexed in the form appearing in the abstracted publication; given names are reduced to initials. Each author entry gives the publication title and the citation number. The document type, e.g., R for Report; country of publication, e.g., US; and language of the document, e.g., In German; are given in parentheses at the end of the entry. If no language statement appears, the language is English. Tables of document types and country of publication codes appear after the indexes. For publications with multiple authors, an entry is provided for each author. Entries for the second and succeeding authors give references to the first author.

Because of problems involved in the mechanical preparation of this index, all accent marks are omitted. Changes in spelling introduced as a result of accent omission follow standard conventions.

A

Aamodt, R.E., *See* Hafizi, B., 8:45160

Aaron, W., Cermets and method for making same, 8:44248 (P;US)

Abbott, L.F., *See* Kirsch, L.E., 8:44911

Abdullaeva, M.K., *See* Ayukhanov, A.H., 8:44865

Abdushukurov, D.A., Investigation of characteristics of multistep avalanche chamber, 8:44591 (R;SU;In Russian)

Abe, K., Elastic neutrino-electron scattering: a progress report on Exp734 at Brookhaven, 8:44912 (R;US)

Abel, K.H., *See* Toste, A.P., 8:43396

Abouguendia, Z., *See* Swanson, S., 8:43395

Abrams, G.S., *See* Loehr, B., 8:44928

Abroyan, I.A., Radiation-induced defects in silicon and germanium. Secondary emission investigation method, 8:44271 (RA;SU;In Russian)

Acker, F., *See* Woolf, L.D., 8:44249

Ackerhalt, J.R., *See* Milonni, P.W., 8:44407

Ackermann, H., *See* Berger, C., 8:44915

Acquavella, J., *See* Reyes, M., 8:44800

Adamovskij, L.A., Metrology installation for studies of the accuracy of correlation methods for sodium flow rate measurements, 8:43812 (R;SU;In Russian)

Adams, C.H., Utility subroutine package used by Applied Physics Division export codes, 8:43797 (R;US)

Adams, G.S., *See* Baker, F.T., 8:45009

Adams, O.B., *See* Johnson, R.L., 8:45199

Adams, R.P., Production of liquid fuels and chemical feedstocks from milkweed, 8:43442 (BA;US)

Adams, T.F., Simulation of rock blasting with the SHALE code, 8:43302 (R;US)

Adelberger, E.G., *See* Snover, K.A., 8:44978

Adkins, G.S., Radiative corrections to positronium decay, 8:44903 (J;US)

Adler, F., Dirt management in Ruhr coal mines, 8:43220 (R;DE;In German)

Adler, S.L., Quasi-Abelian versus large-N/ sub c/ linear confinement, 8:44955 (J;US)

Adylov, A.A., Some aspects of the secondary ion emission from metals, 8:44867 (RA;SU;In Russian)

Aerts, A.T., *See* Mulders, P.J., 8:44936

Afanas'ev, V.A., *See* Adamovskij, L.A., 8:43812

Agamy, S.A., *See* Robinson, J.E., 8:44853

Agapito, J.R., Transient analysis models for nuclear power plants, 8:43777 (RA;BR;In Portuguese)

Agapov, N.N., Microprocessor control system for large helium liquefier, 8:44388 (R;SU;In Russian)

Agarwal, B., Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves, 8:44014 (J;GB)

Agarwal, J.K., Real-time aerodynamic particle size analyzer, 8:44636 (RA;DE)

Agid, Y., *See* Baron, J.C., 8:44763

Ahlen, S.P., Observation of large deviations from the Bethe-Bloch formula for relativistic uranium ions, 8:45052 (J;US)

Ahlf, J., Investigation on the dependence of RPV steel embrittlement on irradiation temperature and neutron exposure, 8:44138 (R;DE)

See Anders, D., 8:43755

Ahmad, I., Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8:45025 (J;US)

Ahrens, L.A., *See* Abe, K., 8:44912

Aiello, D.P., *See* Hay, H.R., 8:43617

Aimone, C.T., Drilling and blasting techniques and costs for strip mines in Appalachia, 8:43250 (R;US)

Ajnetdinov, E.B., Energy and charge distributions in scattered particle flux under 5-60 keV hydrogen ion bombardment of copper target, 8:44855 (RA;SU;In Russian)

Akhiezer, I.A., Classical theory of relativistic charged particle radiation in crystals, 8:45047 (RA;SU;In Russian)

Akinsete, V.A., Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above, 8:44424 (R;BR)

Akridge, J.M., Investigation of passive cooling techniques for hot-humid climates, 8:43569 (RA;US)

Alam, A., Positron studies of solute clustering and lattice defects in Al-Zn alloys, 8:44229 (BA;NL)

Alberding, N., *See* Crozier, E.D., 8:44286

Albrecht, P., Operational behaviour of wind power plants. Pt. 2, 8:43697 (RA;DE;In German)

Albright, J.N., *See* Pearson, C.F., 8:43655

Aldred, A.T., *See* Noakes, D.R., 8:44309

See Radousky, H.B., 8:44251

Aldrich, D.C., *See* Strip, D.R., 8:43961

Alexeev, A.N., Organization of M-6000 computer operation on-line with experimental apparatus, 8:44585 (R;SU;In Russian)

Alejnikov, V.E., Study on the high-energy neutron fluence and dose rate meter response, 8:44597 (R;SU;In Russian)

Aleksandrov, V.D., Experimental study of the neutron spectra of lead, using a 14 MeV neutron source, 8:45056 (TJ;DE;In German)

Aleksandrova, I.V., Software for the SONET computer network intended for automation of scientific experiments, 8:43891 (R;SU;In Russian)

Alekseev, Yu.A., Toroidal magnet for a tokamak with a strong magnetic field and combined adiabatic compression of the plasma filament, 8:45223 (R;SU;In Russian)

Alessi, J., *See* Sluyters, T., 8:44512

Alessi, J.G., Ring-magnetron ionizer for polarized negative-ion sources, 8:44511 (R;US)

Alesso, H.P., Initial guidance on digraph-matrix analysis for systems interaction studies, 8:43939 (R;US)

Alexander, A.T., *See* Partridge, L.J., 8:43228

Alfimenko, A.V., *See* Aleksandrova, I.V., 8:43891

Alford, J.J., *See* Kolb, C.R., 8:43371, 8:43372

Alford, W.P., Two-step contributions in the ^{208}Pb(t,p) ^{210}Pb two-neutron transfer reaction, 8:45018 (J;US)

Alivisatos, A.P., *See* Whitmore, P.M., 8:44306

Allen, A.L., Cellulase production in continuous and fed-batch culture by Trichoderma reesei MCG80, 8:44782 (J;US)

Allen, B.R., *See* Hillman, M., 8:43451

Allen, R.D., *See* Kannberg, L.D., 8:43974

Allen, R.E., Program reference book for the Energy Economic Data Base Program (EEDB), 8:43828 (R;US)

See Buisson, J.P., 8:44291

Allen, R.P., *See* Arrowsmith, H.W., 8:43376

Allen, S.L., *See* Grubb, D.P., 8:45169, 8:45170

See Simonen, T.C., 8:45187

Allhorn, H., *See* Huber, W., 8:43239

Allison, L.J., *See* Olson, J.S., 8:44710
Allison, S.W., Use of fiber optics and laser-induced fluorescence for remote measurements of UF_6 in strong rotation, 8:44639 (R;US)
Allred, L.D., Demonstration project for methane recovery from unmineable coalbeds. Final report, 8:43249 (R;US)
Alonso, E.V., *See* Cruz, S.A., 8:45051
Alpert, D.J., *See* Strip, D.R., 8:43961
Alpizar, L., *See* Biancas, A., 8:43521
Altafini, C.R., Simulation of gas compressible flow by free surface water flow, 8:44905 (R;BR;In Portuguese)
Altman, A., Observation of a quasideuteron component in the reaction $^{12}C(\pi^+,2p)$, 8:44981 (J;US)
Altpeter, L.L. Jr., *See* Huebler, J.E., 8:43297
Alvim, A.C.M., Development of a computer code for transients simulation in PWR type reactors, 8:43921 (RA;BR;In Portuguese)
See de Oliverira Barroso, A.C., 8:44427
Alzheimer, J.M., *See* Andrews, W.B., 8:43333
Amagishi, Y., *See* Tsushima, A., 8:45138
Amako, K., *See* Abe, K., 8:44912
Amaral, M.G.D., Quark model with one-gluon corrections. Radially excited states, 8:44933 (J;US)
Ambrozio Filho, F., *See* Fogaca Filho, N., 8:43770
Amer, N.M., *See* Jackson, W.B., 8:44302
Amero, R., *See* Jones, G.E. Jr., 8:43175
Ames, L.L., Selenium sorption on a Columbia River basalt, 8:44819 (R;US)
Amidei, D., *See* Loehr, B., 8:44928
Amzallag, C., Effects of PWR environment on the fatigue crack growth of different stainless steels and inconel type alloy, 8:43783 (RA;US)
Fatigue crack growth of low alloy steels in PWR environment, 8:44182 (RA;US)
Anan'eva, M.A., Magnetic spectrometer data handling of JINR. Data handling system and pattern recognition of events, 8:44582 (R;SU;In Russian)
Anan'in, O.B., Cyclotron acceleration of C_{13}^{3+} ions produced in a laser plasma, 8:44548 (R;SU;In Russian)
Anashkin, O.P., Study on training and mechanical degradation in superconducting magnet models, 8:44377 (R;SU;In Russian)
Anders, D., Device for investigating subcritical crack growth of RPV steel specimens under BWR conditions, 8:43755 (RA;US)
Andersen, L.J., Use of "The Capillary Barrier" as a shield against ground-water pollution from fly-ash deposits, 8:43203 (RA;DK)
Anderson, A., *See* Buesing, J.W., 8:43627
Anderson, A.N., *See* Jones, S.E., 8:45215
Anderson, B.C., *See* Barna, B.A., 8:43353
Anderson, G.L., Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8:43173 (R;US)
Anderson, J.L., *See* Jones, S.E., 8:45215
Anderson, J.M., Business criteria for coal gasification, 8:43158 (RA;US)
Anderson, J.R., Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8:44197 (R;US)
Anderson, R.C., *See* Feldman, W.C., 8:44834
Anderson, W.D., 100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results, 8:43706 (R;US)
Andersson, L., *See* Wollenberg, H., 8:44817
Andrade, E.P., *See* Pinheiro, R.B., 8:43831
Andrasi, A., *See* Urban, J., 8:44610
Andreotti, R.E., *See* Allen, A.L., 8:44782
Andrews, G.F., Bacterial coal desulfurization, 8:43187 (J;US)
Andrews, L.J., Development of materials for a luminescent solar collector. Final report, September 1, 1979-December 31, 1982, 8:43646 (R;US)
Andrews, W.B., Transportation packaging for processed transuranic waste, 8:43333 (R;US)
Angerer, F., Road and environment, 8:44754 (R;DE;In German)
Anishchenko, N.G., Dubna synchrophasotron. Operation and improvement (June - September, 1981), 8:44537 (R;SU;In Russian)
Anjaneyulu, Y., Transient flux flow voltages in type II superconductors, 8:45078 (J;US)
Antal, J., Quantum theory of the emission of secondary ions from metal surfaces, 8:44864 (RA;SU)
Anthes, J.P., Evidence for plasma jet formation in long-pulse laser irradiation of thin planar Al targets, 8:44208 (J;US)
Apel, W.D., *See* D'Agostini, G., 8:44919
Apfel, R.E., Instrument to detect vapor-nucleation in superheated liquid, 8:44567 (R;US)
Investigations on the applicability of superheated drop detectors in neutron dosimetry, 8:44568 (R;US)
Appelbaum, H.R., *See* Feldmann, H.F., 8:43427
Appelhans, A.D., Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup, 8:43747 (R;US)
Overview of the PBF Severe-Fuel-Damage Program and results of the first test, 8:43903 (R;US)
Arai, S., *See* Nakanishi, T., 8:44470
Arakawa, E.T., *See* Little, J.W., 8:44837
Arcilla, N.T., *See* Davis, C.R., 8:43833
Ardell, A.J., Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983, 8:44133 (R;US)
Ardill, R.W.B., Numerical studies of renormalization in SU(3) gauge theory in four dimensions, 8:44954 (J;US)
Argyris, J.H., OPTIWA - optimisation of large wind power plants, 8:43695 (RA;DE;In German)
Arkad'eva, E.N., Cadmium telluride detector crystals, alloyed by chlorine, 8:44612 (RA;SU;In Russian)
Arko, A.J., f-band dispersion in UIr_3: An angle-resolved and resonant photoemission study, 8:44223 (J;US)
Armbruster, P., *See* Geissel, H., 8:45041
Armendariz, M.G., Transient response of GaAs microwave power FET to x-ray pulses, 8:44626 (R;US)
Armijo, J.R., Additive for iron disulfide cathodes used in thermal batteries, 8:43980 (P;US)
Armour, D.G., *See* Cruz, S.A., 8:45051
See Donnelly, S.E., 8:44874
Armstrong, P.R., Passive marketable products program automatic insulating roller curtain development, 8:44066 (RA;US)
Armstrong, R.A., Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8:45188 (J;US)
Arnaud, M., *See* Rocchia, R., 8:44563
Arnold, C. Jr., *See* Dodson, B.W., 8:44351
Arnold, J.R., Domestic natural gas reserves and production dedicated to interstate pipeline companies, 1982, 8:43292 (R;US)
Arnush, D., Free electron maser for fusion applications, 8:45211 (RA;US)
Arremark, R., Strategic analysis. A proposal for a method of investigation illustrated by the future competing situation of coal with biomass fuels, 8:43266 (R;SE;In Swedish)
Arrowsmith, H.W., New decontamination techniques for exposure reduction, 8:43376 (R;US)
Arsenin, V.V., Experimental study on flute oscillations in an open trap with magnetic field minimum, 8:45106 (R;SU;In Russian)
Artemenkov, L.I., First experiments on the TO-2 tokamak with a divertor, 8:45224 (R;SU;In Russian)
Arumi-Noe, F., Continued development and physical validation of computer program DEROB, 8:43574 (RA;US)
Arzumanyan, G.M., Laser ion source for a mass spectrometer, 8:44602 (R;SU;In Russian)
Asenjo, J.A., Growth and citirc-acid production by Candida guilliermondii using a cellulose substrate, 8:43520 (J;US)
Ashley, C.M., Super-insulated energy education center in Syracuse, New York, 8:44064 (RA;US)
Ashley, D.C., *See* Ashley, C.M., 8:44064
Askerov, Sh.G., Influence of surface microstructure on cathode sputtering of metals in the near threshold energy range, 8:44851 (RA;SU;In Russian)
Aston, W.J., *See* Turner, A.P.F., 8:44059
Atencio, J.D., *See* Nicholson, N., 8:43406
Atkinson, J.D., Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8:43860 (RA;US)
Atsagortsian, K.Z., Modulation instability in a plasma-electron beam system, 8:45104 (R;SU)
Atwood, C.L., *See* Meachum, T.R., 8:43873
Auer, I.P., *See* Burleson, G.R., 8:44927
Auerbach, J.M., *See* Carey, R.W., 8:45265
Auerbach, N., Influence of nucleon internal degrees of freedom on the strength of electric giant resonances at low energies, 8:45038 (J;US)
Transition densities for charge-exchange components of giant isovector resonances and the proton-neutron density distributions in nuclei, 8:45035 (J;US)

August, R.A., *See* Woodworth, J.G., 8:44977
Augustyn, W.H., X-ray microscope design study. Final report, 8:44644 (R;US)
Aurstad, M., *See* Fladmark, G.E., 8:43274
Austin, M.M., *See* Sonder, E., 8:44459
Austin, S.R., Investigation of sedimentary, mineralogical, chemical, and color patterns and associations in the Rio de Oro mine, McKinley County, New Mexico. National Uranium Resource Evaluation, 8:43325 (R;US)
Aver'yanov, P.G., Development of the installation for zirconium alloy corrosion testing in superheated steam flow in a reactor channel, 8:43792 (R;SU;In Russian)
Awschalom, M., New look at displacement factor and point of measurement corrections in ionization chamber dosimetry, 8:45062 (J;US)
Scaling neutron absorbed dose distributions from one medium to another, 8:45061 (J;US)
Axmann, A., Proposal for extension of the Berlin Research Reactor BER II, 8:43887 (R;DE;In German)
Aystoe, J., *See* Wouters, J.M., 8:45006
Ayukhanov, A.H., Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal, 8:44865 (RA;SU)
Azmy, Y.Y., A nodal integral method for the numerical solution of incompressible fluid flow problems, 8:45280 (J;US)

B

Babad, H., *See* Deju, R.A., 8:43378
Babalin, A.I., 5 KV low-induction capactitor battery, 8:45231 (RA;SU;In Russian)
Babicky, V., *See* Kolacek, K., 8:45130
Babonneau, D., X ray emission experiments at 1.06 μm and 0.35 μm, 8:44836 (R;FR)
Babu, S.P., *See* Kosowski, G.M., 8:43428
See Onischak, M., 8:43422
Baccei, B., Overview of Passive Solar Manufactured Buildings and Metro Denver Home Builders programs, 8:43557 (RA;US)
Bacconnet, E., 100 kW Solar Thermal Electric Experimental Plant, 8:43534 (R;FR)
Bache, B.W., Role of soil in determining surface water composition, 8:44725 (RA;DK)
Bachilieri, P., *See* Anan'eva, M.A., 8:44582
Badalec, V., *See* Stoeckel, J., 8:45122
Bader, S.D., Autoionization emission from transition metals by electron impact, 8:44893 (J;US)
See Hamaker, H.C., 8:44246
See Shelton, R.N., 8:44245
See Zajac, G., 8:44206, 8:44329
Baer, D.R., Fly ash and coal mineral matter transformations during heating, 8:43193 (R;US)
Baer, H.W., *See* Bowman, J.D., 8:45004
Baer, T., Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986, 8:44350 (R;US)
Baggett, N., Detectors for CBA, 8:44561 (R;US)
Baginyan, S.A., Software development minimum guidance system. Algorithm and specifications of realizing special hardware processor data prefilter program, 8:44605 (R;SU;In Russian)
Bahm, R.J., Optimum collector area to storage ratio for water wall space heating, 8:43572 (RA;US)
Baijot, B., *See* Michaux, M., 8:44784
Bailey, D., Ab initio calculations of the charge state of a fast heavy ion stopping in a finite temperature target, 8:44842 (RA;DE)
Bailey, J.J., Homemaker energy management. Final report, 8:44113 (R;US)
Residential energy survey film. Final report, 8:44114 (R;US)
Bailly, H., Fabrication of plutonium fuel for fast neutron reactors, 8:43800 (R;FR;In French)
Bakale, G., Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8:44359 (R;US)
See Isildar, M., 8:44787
Baker, B., High-temperature molten-carbonate fuel cells. Technical progress report, January-March 1978, 8:44055 (R;US)
Baker, D.F., Electrical properties of glassy carbon, 8:44281 (R;US)
Baker, F.T., sup(90,92)Zr(p vector,p') reactions at Esub(p)=800 MeV, 8:45009 (J;NL)
Baker, H.C., *See* Payne, M.G., 8:44904
Baker, J.D., *See* Greenwood, R.C., 8:45014
Bakhru, H., *See* Shastry, S., 8:45008
Bakhvalov, N.S., Numerical simulation of the motion of a dense electron bunch interacting with a pulsed accelerating field in an inhomogeneous cavity, 8:44500 (R;SU;In Russian)
Balasubramanian, K., Symmetry groups of chemical graphs, 8:44355 (J;US)
Balbekov, V.I., Analysis of factors effecting superconducting dipole field homogeneity, 8:44493 (R;SU;In Russian)
Baldwin, C.A., *See* Stallmann, F.W., 8:43786
Baldwin, D.L., *See* Bray, L.A., 8:43375
Baldwin, T.E., *See* Croke, K.G., 8:43997
Ballinger, R.G., Role of uncertainty in the measurement of crack length by compliance techniques, 8:44177 (RA;US)
Ballone, P., Surface density profile and surface tension of the one-component classical plasma, 8:45109 (R;XA)
Ballve, H., *See* Graca, M.C., 8:44422
Baluka, G., Two-parameter "Time-detector's number" analyzer based on a minicomputer for the KDSOG-M neutron spectrometer, 8:44595 (R;SU;In Russian)
Bame, S.J., *See* Feldman, W.C., 8:44834
Bamford, W.H., Corrosion fatigue crack growth of pressure vessel welds in PWR environment, 8:43779 (RA;US)
Bane, K., Handy impedance formulae, incoherent synchrotron frequency, and head-tail tune shift in PEP, 8:44505 (R;US)
Verification of the SLC wake potentials, 8:44506 (R;US)
Banerjee, B., *See* Matsui, T., 8:44932
Banerjee, S., *See* D'Agostini, G., 8:44919
Bang, G.W., *See* Meshii, M., 8:44128
Bangerter, R.O., U.S. program in heavy-ion fusion, 8:44964 (RA;DE)
Bantista Filho, B.D., *See* Konuk, A.A., 8:44417
Baptista Filho, B.D., New method to calculate pressure drop and shell-side heat transfer coefficient in a shell-and-tube heat exchanger, 8:44420 (R;BR;In Portuguese)
Baragiola, R.A., Mechanism for damage and sputtering of non-metals by low energy ions, 8:44266 (RA;SU)
Baranov, G.A., Shock-excited homopolar generator as inductive energy storage, 8:45230 (RA;SU;In Russian)
Baranov, I.A., Materials sputtering by fission fragments, 8:44876 (RA;SU;In Russian)
Baranov, Yu.F., High-frequency plasma heating in tokamak FT-1 at overcritical density. I., 8:45115 (RA;CS;In Russian)
Baranovskij, A.I., *See* Aleev, A.N., 8:44585
Barbee, J.G., *See* Rodriguez, C.F., 8:44127
Bardsley, J.N., *See* Hazi, A.U., 8:44897
Barkenbus, J.N., Prospects and opportunities for nuclear power regulatory reform, 8:43825 (R;US)
Barna, B.A., Automated NDT techniques in radioactive waste management, 8:43353 (R;US)
Barnes, C.E., *See* Wiczer, J.J., 8:44315
Barnes, J.E., Oil supply/demand pricing trends, 8:44034 (RA;US)
Barnes, S.M., *See* Buelt, J.L., 8:43346
Barnett, T.P., Long-term trends in dynamic height and sea surface temperature, 8:44727 (R;US)
Barnhart, J., Experimental investigation of interfacial shear in large-particle-coal hydrotransport, 8:43255 (R;US)
Baron, J.C., In vivo study of the dopaminergic receptors in the brain of man using ^{11}C-pimozide and positron emission tomography, 8:44763 (R;FR)
Local cerebral blood flow (1CBF) and oxygen consumption ($1CMRO_2$) in evolving irreversible ischemic infarction: a study with positron tomography and oxygen-15, 8:44762 (R;FR)
Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine, 8:44765 (R;FR;In French)
Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man, 8:44764 (R;FR)
Barr, H.C., *See* Thomsen, M.F., 8:44833
Barroso, D.E.G., Comparative study of fuel management in PWR reactors, 8:43775 (RA;BR;In Portuguese)
Barsell, A.W., Reactor siting risk comparisons related to recommendations of NUREG-0625, 8:43879 (BA;US)

Barsin, J.A., Commercialization of coal-water slurries - II, 8:43259 (RA;US)
Bartel, W., Differential 3-Jet cross section in e^+e^--annihilation and comparison with 2sup(nd)-order predictions of QCD and Abelian vector theory, 8:44916 (R;DE)
Bartella, J., *See* Oechsner, H., 8:44848
Barth, D.S., Environmental standards, 8:43993 (RA;US)
Barthelmae, L., Influence of air flow inside the combustion space on the exhaust emissions of a direct-injection diesel engine, 8:44122 (R;DE;In German)
Barton, D.S., Experimental study of the A dependence of inclusive hadron fragmentation, 8:44922 (J;US)
Bartsch, A.F., *See* Jaworski, N.A., 8:44723
Basin, S.L., *See* Lim, E.Y., 8:43966
Baskes, M.I., DIFFUSE 83, 8:45312 (R;US)
Bass, M., Multiple-pulse laser-induced damage in crystalline and fused quartz. Final report, 8:44263 (R;US)
See Merkle, L.D., 8:44264, 8:44265
Bassel, W.S., Thermal stresses in a PWR pressure vessel, 8:43771 (R;BR;In Portuguese)
Bateman, G., Ripple-reduction poloidal-field coils for tokamak reactors, 8:45218 (R;US)
Bateman, J.E., In vivo imaging of the human thyroid with the Rutherford positron camera using ^{124}I, 8:44777 (R;GB)
Baudry, G., *See* Amzallag, C., 8:43783
Baumann, N.P., *See* Winn, W.G., 8:44569
Baumgaertner, E., *See* Marten, K., 8:43808
Baur, A., TRIPOLI.2. A 3D Monte Carlo system for thermal reactor applications, 8:43758 (R;FR)
Bayer, A., Applications of nuclear accident consequence models, 8:43962 (BA;US)
See Ehrhardt, J., 8:43927
Bayne, C.K., *See* MacDougall, C.S., 8:44354
Bazyleva, N.P., *See* Agapov, N.N., 8:44388
Beasley, C.O. Jr., *See* van Rij, W.I., 8:45146
Beattie, M., Rocks and Trees Community Center, 8:43607 (RA;US)
Beattie, W.H., *See* Maier, W.B., 8:44313
Beaudry, B.J., *See* Saw, C.K., 8:44203
Beck, G., *See* Bakale, G., 8:44359
Becker, G., Dynamical network feedback of controlled DC drivings with high performance, 8:43739 (R;DE;In German)
Becker, K.H., *See* Scheibel, H.G., 8:44676
Beckman, W.A., *See* Duffie, J.A., 8:43575
See Parsons, B.K., 8:43645
Beckroege, W., *See* Obermair, G.M., 8:43673
Begrambekov, L.B., *See* Tel'kovskij, V.G., 8:44268
Begun, G.M., *See* Hobart, D.E., 8:44365
Behrend, E., Investigations of glands for valves and slides for gases, 8:43732 (R;DE;In German)
Behrisch, R., Which atomic processes dominate plasma wall interaction, 8:44152 (RA;SU)
See Seefeld, H., 8:44873
Behroozi, F., Observation of a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2, 8:44247 (J;US)
Beier, R.A., Soot volume fraction profiles in forced-combusting boundary layers, 8:44370 (J;US)
Beisswaenger, F., *See* Jansky, J., 8:44191
Belanger, D.P., *See* Birgeneau, R.J., 8:44293
Bell, D.J., *See* Zaininger, H.W., 8:43718
Bell, R.T., Corrosion-resistant uranium, 8:44209 (P;US)
Bell, T.L., *See* Lin, Y.S., 8:44730
Bellmann, D., *See* Ahlf, J., 8:44138
Bello-Ochende, F.L., *See* Akinsete, V.A., 8:44424
Beloshitskij, P.F., Computer simulation of radiation instability in relativistic electron rings, 8:44499 (R;SU;In Russian)
Belov, A.G., MT-22 microtron, 8:44547 (R;SU;In Russian)
Radiation situation on the 16 MeV electron accelerator-microtron, 8:44545 (R;SU;In Russian)
Systems of supply and monitoring of MT-22 microtron, 8:44540 (R;SU;In Russian)
Belushkin, V.A., *See* Agapov, N.N., 8:44388
Belyakov, V.S., *See* Abroyan, I.A., 8:44271
Belyj, I.M., Radiation damage and implanted impurity distribution in GaAs on P ion implantation, 8:44276 (RA;SU;In Russian)
Ben-Jacob, E., Shot noise effect on the nonzero voltage state of the hysteretic Josephson junction, 8:44394 (J;US)
Bender, C.M., *See* Turner, L., 8:44950
Bender, D.M., Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8:43909 (R;US)
Bendiksen, K., Severe slugging in two-phase flow systems, 8:43290 (R;NO)
Benerech, G., Iodine determination in a PWR reactor during normal operation, 8:43874 (R;FR;In French)
Bengtsson, C., Metallographical methods for observation of creep cavities in service exposed low alloyed steel, 8:44198 (R;SE)
Benjamin, A.S., *See* Hatch, S.W., 8:43950
Bennett, L.H., *See* Watson, R.E., 8:45074
Bennett, P.R., *See* Hatch, S.W., 8:43950
Benny, R.I., Report on financing the disposal of commercial spent nuclear fuel and processed high-level radioactive waste, 8:43344 (R;US)
Benoist, Pierre, *See* Yang, Chuande, 8:43838
Bensinger, J., Search for production of narrow p-barp states with a 5-Gev/cp-bar beam, 8:44925 (J;US)
Bensinger, J.R., *See* Kirsch, L.E., 8:44911
Bensky, M.S., *See* Deju, R.A., 8:43378
Bentley, G.E., *See* Grant, P.M., 8:44366
Bentzen, E.H. III, *See* Pattengill, M.G., 8:43350
Berberich, K., *See* Obermair, G.M., 8:43673
Beres, R.P., *See* Buisson, J.P., 8:44291
Berezhnoj, V.A., Special program-controlled processor of the MELAS system and its software, 8:44570 (R;SU;In Russian)
Berge, N., *See* Shuster, R., 8:43471
Berger, C., Measurement of charge properties of quark jets at PETRA, 8:44915 (R;DE)
Berger, R., Analysis and reduction of degradation of working fluid in the Sundstrand Organic Rankine-Cycle System, 8:44097 (R;US)
Bergman, D.J., *See* Ben-Jacob, E., 8:44394
Bergstroem, H., *See* Smedman, A.S., 8:43676
Berk, H.L., Local WKB dispersion relation for the Vlasov—Maxwell equations, 8:45157 (J;US)
Nonintrinsic ambipolar diffusion in turbulence theory, 8:45172 (J;US)
Berkey, J.H., *See* Dalder, E.N.C., 8:45262
Berlad, A.L., Hydrogen combustion characteristics related to reactor accidents, 8:43935 (R;US)
Berman, B.L., *See* Pywell, R.E., 8:44993
Bernabei, S., *See* Jobes, F., 8:45148
See Stevens, J., 8:45152
Bernard, J.L., *See* Amzallag, C., 8:43783, 8:44182
Bernard, M.J., *See* Millar, M., 8:44088
Bernstein, A.J., FORSITE, a multiple-project management system: production of critical-path development schedules for geothermal electric-power-generation projects, 8:43663 (R;US)
See Entingh, D.J., 8:43653
Berry, F.O., *See* Anderson, G.L., 8:43173
Berry, R.S., *See* Mozurkewich, M., 8:45083
Berry, S.D., *See* Breinig, M., 8:44901
Berry, W.L. Jr., *See* Thigpen, P.L., 8:43441
Berryman, J.G., Effective conductivity by fluid analogy for a porous insulator filled with a conductor, 8:45070 (J;US)
Bersohn, R., *See* Brewer, P., 8:44881
See Das, P., 8:44882
Bertin-Maghit, G., High speed motion-picture photography. Instrumentation and application, 8:44629 (R;FR;In French)
Bertram, K.M., *See* Saricks, C.L., 8:44089
Bethell, L.R., Salt River Project South Consolidated Hydroelectric Generating Station. DOE Small-Scale Hydroelectric Demonstration Program. First annual operating report, September 1, 1981 to August 31, 1982, 8:43476 (R;US)
Bethke, S., *See* Elsen, E., 8:44917, 8:44918
Betz, G., Sputtering yields for two-phase Ag-Cu thin film alloys, 8:44846 (RA;SU)
Beuhler, R.J., Comparison of secondary electron yields from accelerated water cluster ions ($M/z < 50\,000$) striking Al_2O_3 and copper surfaces, 8:44202 (J;US)
Bevelacqua, J.J., Isospin mixing in the ^{4}He giant dipole resonance, 8:44971 (J;US)
Bevilacqua, L., *See* Taroco, E., 8:43857
Bevolo, A.J., *See* Shelton, R.N., 8:44245
Beyer, R., *See* Laude, H., 8:43681
Bezgachev, E.A., *See* Baranov, G.A., 8:45230
Beznogikh, Yu.D., *See* Anishchenko, N.G., 8:44537
Bhamathi, G., *See* Gibson, B.F., 8:44938
See Mulders, P.J., 8:44936

Bhandari, J.S., Optimal stabilization policy in a model of elasticity dynamics, 8:43987 (R;US)
Bhat, C.M., Study of the sup(39,41)K(d,^{3}He)sup(38,40)Ar reactions at 22.8 MeV, 8:44999 (J;NL)
Bhatia, T.S., *See* Denes, P., 8:44986
Bialek, W., *See* Goldstein, R.F., 8:45068
Biasin, K., Rational energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Pt. F, 8:44101 (R;DE;In German)
Bieber, A.M. Jr., *See* Lower, C.W., 8:43407
Bigeleisen, J., Construction and maintenance of SUNY facilities at the National Synchrotron Light Source. Progress report, 1 July 1982-1 July 1983, 8:44514 (R;US)
Billen, D., Repair and cell cycle response in cells exposed to environmental biohazards. Progress report, 1 June 1982-31 May 1983, 8:44788 (R;US)
Billon, D., *See* Babonneau, D., 8:44836
Bincer, A.M., Missing label operators in the reduction O(p)arrow-downO(p-2) x O(2), 8:45092 (J;US)
Binder, M., *See* Liebowitz, D., 8:44924
Binnall, E.P., *See* Rogue, F., 8:43389
Binon, F., Study on the coordinate precision of hodoscope hadron calorimeter at energies up to 300 GeV, 8:44571 (R;SU;In Russian)
Birgeneau, R.J., Critical behavior of a site-diluted three-dimensional Ising magnet, 8:44293 (J;US)
Birnbaum, U., *See* Huber, W., 8:43239
Bisanz, R., *See* Hocke, K.D., 8:43911
Bishop, A.R., Coherent spatial structure versus time chaos in a perturbed sine-Gordon system, 8:45086 (J;US)
See Fesser, K., 8:44260
Bishop, D.J., *See* Harrison, F.L., 8:43877
Bistirlich, J.A., *See* Martoff, C.J., 8:44984
Bistline, R., *See* Reyes, M., 8:44800
Bitar, K.M., Four-dimensional CP^2 model on a lattice, 8:44953 (J;US)
Renormalization of U(1) lattice gauge actions, 8:44963 (J;NL)
Bitter, M., *See* Brau, K., 8:45151
Bjelm, L., Preparatory investigation for geothermal heat pump plant in the commune of Landskrona, 8:43657 (R;SE;In Swedish)
System for the investigation of peat bog by radar. Final report. Stage 2, 8:43244 (R;SE;In Swedish)
Bjerkeng, B., Seawater scrubber effluent - an evaluation of possible ecological consequences, 8:43199 (RA;DK)
Bjorklund, W.J., *See* Wheelwright, E.J., 8:43391
Blachot, J., *See* Duchemin, B., 8:43837
Blackmore, G., Quality coal for electric utility use, 8:43726 (RA;US)
Blair, S.C., Determination of important physicochemical processes at an aquifer thermal-energy-storage site in Minnesota using both laboratory and field techniques, 8:43973 (R;US)
Biancas, A., Conversion of henequen pulp to microbial biomass by submerged fermentation, 8:43521 (J;US)
Blanchard, R.J., *See* Montagne, M., 8:43789
Bland, L.C., *See* Greene, S.J., 8:44980
Blass, A., Plastic instability in short tubes with internal pressure, 8:44381 (R;BR;In Portuguese)
Blauel, J.G., Thermal fatigue crack growth analysis in a nozzle corner, 8:44192 (RA;US)
Blaux, J, *See* Bacconnet, E., 8:43534
Bliem, C.J., Raft River binary-cycle geothermal pilot power plant final report, 8:43662 (R;US)
Blind, D., Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8:43784 (RA;US)
Blocker, C.A., *See* Loehr, B., 8:44928
Blondel, C., *See* Rocchia, R., 8:44563
Blum, P., *See* Husinsky, W., 8:44847
Bobkov, V.V., *See* Koval', A.G., 8:44144
Bobrova, N.P., *See* Budzyak, A., 8:44587
Bobrowicz, F.W., Vectorized Monte Carlo photon transport, 8:45049 (R;US)
Bobyr, V.V., Digital time-to-code converter, 8:44575 (RA;SU;In Russian)
Bocher, J.L., *See* Babonneau, D., 8:44836
Bock, R., German HIF program, 8:44967 (RA;DE)
Bodenkamp, J., *See* D'Agostini, G., 8:44919
Boecking, G., Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8:43923 (R;DE;In German)
URANUS investigations on coolant channel temperature for Mol 7c, 8:43924 (RA;DE;In German)
Boegel, A.J., *See* Burnham, J.B., 8:43813
Boegly, W.J. Jr., *See* Francis, C.W., 8:43221
Boehler, R., *See* Ross, M., 8:44199
Boehmer, H., *See* Arnush, D., 8:45211
Boers, A.L., *See* Luitjens, S.B., 8:44854
Bogdanov, D.D., *See* Arzumanyan, G.M., 8:44602
Bogert, A.J. van den, Ideal MHD equilibrium of a weakly toroidal plasma column with elongated cross-section. Part 3: Non-elliptical cross-section and summary, 8:45154 (R;NL)
Boggio, G., Evaluation of research and development. Methods for evaluating the results of European Community R + D programmes, 8:44011 (R;XE;In French)
Bogomolova, E.S., Automatic information system for nuclear spectrometric experiments, 8:44364 (R;SU;In Russian)
Bogren, E., *See* Arremark, R., 8:43266
Boguta, J., Systematics of nuclear matter properties in a non-linear relativistic field theory, 8:45039 (J;NL)
Bohacek, V., 8-stage, 23-kJ, 1-MV Marx generator, 8:45247 (RA;CS)
Boisde, G., Optical fibers and their instrumentation applications, 8:44630 (R;FR;In French)
Bojko, G.A., *See* Paton, B.E., 8:44239
Bokov, M.A., Fragment of the system for tracking accelerator deformations, and test results for the system, 8:44556 (TJ;US)
Boldyshev, V.F., *See* Akhiezer, I.A., 8:45047
Bolotov, V.N., Positron diffusion in porous materials, 8:44877 (RA;SU;In Russian)
Bolton, R., *See* Bowman, J.D., 8:45004
Bondarenko, G.G., Influence of postirradiation annealing on the evolution of stainless steel surface structure bombarded with helium ions, 8:44154 (RA;SU;In Russian)
Surface erosion of silicon carbide under helium ion bombardment, 8:44277 (RA;SU;In Russian)
Bondarenko, P.G., *See* Belov, A.G., 8:44540, 8:44547
Bongardt, K., Funneling of heavy ion beams, 8:44486 (RA;DE)
Bonnemay, A., *See* Salomon-Sigogne, A., 8:43760
Bonniaud, R., Actual point about fission products vitrification, 8:43341 (R;FR;In French)
Boonekamp, P.G.M., Description of SELPE, a model of the Dutch energy supply, 8:44030 (R;NL;In Dutch)
Electric power production data bank: construction and some details, 8:44043 (R;NL;In Dutch)
Boot, A.H., Industrial fuel use in relation to temperature, 8:44046 (R;NL;In Dutch)
Temperatures of industrial process heat, 8:44098 (R;NL;In Dutch)
Bordulya, A.P., *See* Bobyr, V.V., 8:44575
Borgida, A., Data models and data manipulation languages: complementary semantics and proof theory, 8:45320 (BA;US)
Bories, J., *See* Baron, J.C., 8:44762, 8:44764
Borns, D.J., Petrographic study of evaporite deformation near the Waste Isolation Pilot Plant (WIPP), 8:43385 (R;US)
Borodin, V.E., Investigation of polyethylene detector and adiabatic calorimeter in the radiation fields of proton accelerators, 8:44573 (R;SU;In Russian)
Borzakov, S.B., Neutron scintillation detector for the time-of-flight spectrometry, 8:44592 (R;SU;In Russian)
Boswinkel, H.H., Coal exploration in the Netherlands. A research proposal, 8:43243 (R;NL;In Dutch)
Botelho, D.A., *See* Alvim, A.C.M., 8:43921
Bothmann, V., *See* Qvale, B., 8:44465, 8:44466, 8:44467
Botkin, V.A., *See* Grishchenko, V.F., 8:44270
Botta, L., Trends in energy production, 8:44033 (RA;DK)
Bottcher, C., *See* Pindzola, M.S., 8:44890
Botts, T.E., *See* Powell, J.R., 8:43818
Bouchillon, C.W., *See* Watkins, N., 8:43599
Bouillon, H., *See* Biasin, K., 8:44101
Boulaud, D., Parameters influencing the collection efficiency of solid aerosols in cascade impactor, 8:44634 (RA;DE)
Bouma, J.W.J., Frosting and defrosting behaviour of outdoor coils of air-source heat pumps. Final report, figures, 8:44078 (R;XE)
Bourdeau, L.E., *See* Wray, W.O., 8:43628
Bourdet, L., *See* Baur, A., 8:43758
Bousser, M.G., *See* Baron, J.C., 8:44762, 8:44764, 8:44765
Bowen, A., Global state-of-the-art of passive cooling and dehumidification, with potential applications for

overheated US conditions, 8:43615 (RA;US)
Bowen, N., PDX ECRH, 8:45097 (RA;US)
Bowers, D.L., *See* Vandegrift, G.F., 8:43393
Bowles, T., *See* Denes, P., 8:44986
Bowman, J.D., Observation of the nuclear isovector monopole resonance, 8:45004 (J;US)
Bowring, R.W., MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description, 8:43897 (R;GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes, 8:43898 (R;GB)
Boyaraki, A.M., *See* Loehr, B., 8:44928
Boyd, D.A., *See* Ellis, R.F., 8:45178
Boyd, J.V., Commissioning of a commercially available vibrating office aerosol generator, 8:44678 (RA;DE)
Boyd, R.D., Correlation theory for steady natural convective heat transport in horizontal annuli, 8:44439 (J;US)
Boyd, R.N., *See* Alford, W.P., 8:45018
Bozsik, I., *See* Hofmann, I., 8:44484, 8:44491
Braasch, R.H., Vertical axis wind turbine research and development, 8:43709 (RA;US)
Bradbury, J.N., *See* Jones, S.E., 8:45215
Bradwell, A.R., *See* Bateman, J.E., 8:44777
Braga, C.V.M., Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor, 8:43772 (R;BR;In Portuguese)
Bragg, R.H., *See* Baker, D.F., 8:44281
Braid, R.B., *See* Collins, N.E., 8:44026
Brakke, D.F., Timing of acidification-induced biological changes in lakes and the relationship to predator-prey interactions, 8:44733 (RA;DK)
Brandell, L., Some comments on the WEC energy demand model, 8:43985 (R;SE)
Brandenburg, G.W., *See* Barton, D.S., 8:44922
Brandes, H., New solution of energy problems for industrial operation by cogeneration, 8:44093 (R;DE;In German)
Brandshaug, T., *See* Svalstad, D.K., 8:43382
Brandt, R., *See* Tress, G., 8:44386
Brandt, S., *See* Hicks, H.G., 8:45003
Brandt, W., *See* Stern, S., 8:44316
Brau, K., Plasma rotation in the PDX tokamak, 8:45151 (R;US)
Braun, H.F., *See* Vining, C.B., 8:44310
Braun, K.A., *See* Argyris, J.H., 8:43695
Braun, P., *See* Betz, G., 8:44846
Bray, L.A., Thermal release of volatile fission products from irradiated nuclear fuel, 8:43375 (R;US)
Brazulev, D.P., Autonomous cryogenic targets for neutron-physical experiments, 8:44535 (RA;SU;In Russian)
Brehm, R., Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8:43830 (R;US)
Breidenbach, A.W., Development of technology for environmental control, 8:43994 (RA;US)
Breidenbach, M., *See* Loehr, B., 8:44928
Breinig, M., Comment on high-Rydberg-state production in convoy electron experiments, 8:44901 (J;US)
Bremer, D., Passive studio and case studies for design professionals, 8:43619 (RA;US)
Breuer, H., *See* Kwiatkowski, K., 8:44989
Brewer, P., Measurement of the relative populations of I(^{2}P°/sub 1/2/) and I(^{2}P°/sub 3/2/) by laser induced vacuum ultraviolet fluorescence, 8:44881 (J;US)
Brezina, J., *See* Wollnik, H., 8:44526
Brice, D.K., *See* Cruz, S.A., 8:45051
Briddell, K., Libertytown solar demonstration home, 8:43576 (RA;US)
Bridges, J.D., Fertilizer trends 1982, 8:44009 (R;US)
Brinkmann, W., Accreting neutron stars, 8:44825 (R;BG)
Brinkmeier, G., *See* Feldt, W., 8:44747
Brittain, R.D., *See* Wood, B.J., 8:43170
Brockmann, R., *See* Stroeble, H., 8:45023
Broglia, R.A., *See* Esbensenm, H., 8:45037
Bronisz, S.E., Space nuclear-safety program. Progress report, January 1983, 8:43417 (R;US)
Brookins, D.G., Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8:43309 (R;US)
Brose, G.O. do Vale Pereira, Surface ozone in the Cologne region, 8:44683 (R;DE;In German)
Brosset, C., Transport of airborne mercury emitted by coal burning into aquatic systems, 8:43223 (RA;DK)
Brown, B.A., *See* Snover, K.A., 8:44978
Brown, B.W., *See* Barna, B.A., 8:43353
Brown, D.J., Cement radwaste solidification studies. Third annual report, 8:43339 (R;GB)
Brown, J.A., Double electron-muon resonance experiments on muonium in quartz, 8:44307 (J;US)
Brown, M.K., *See* Seidl, P.A., 8:44997
Brown, M.L., *See* Dixit, B.S., 8:43474
Brown, P.E., *See* Allen, R.E., 8:43828
Brown, R.E., *See* Alford, W.P., 8:45018
See Cizewski, J.A., 8:45019
Browne, L.M., *See* Wheelwright, E.J., 8:43391
Brownell, B.R., Critical analysis of the home builder's introduction to passive solar in New York State, 8:43585 (RA;US)
Bruckmuller, R., *See* Husinsky, W., 8:44847
Brudanin, V.B., *See* Bogomolova, E.S., 8:44364
Bruegmann, J., *See* Fries, S., 8:43684
Bruggink, J.J.C., Energy prices and employment, 8:43988 (R;NL;In Dutch)
Bruggink, P., *See* Jones, G.E. Jr., 8:43176
Bruhns, H., Experimental studies of spheromak formation, 8:45184 (J;US)
Brumm, T.J., Electrochemical oxygenation of livestock wastes, 8:43525 (J;US)
Brumovksy, M., Subcritical crack growth in underclad region, 8:44193 (RA;US)
Bryan, G.H., *See* Wheelwright, E.J., 8:43391
Bryant, B., *See* Lornell, R., 8:43481
Bryman, D., TRIUMF kaon factory, 8:44480 (R;CA)
Bube, R.H., *See* Huber, W., 8:44289
Buchholz, H., *See* Axmann, A., 8:43887
Buchwald, G., Importance of the beam geometry for the dynamical stability of inertial confinement fusion targets, 8:44531 (RA;DE)
Buck, A.L., History of the Atomic Energy Commission, 8:43743 (R;US)
Budnar, M., *See* Trkov, A., 8:43842
Budnikov, A.T., *See* Katrich, N.P., 8:44155
Budzyak, A., Helium streamer chamber with laser track registration at gas pressure up to 5 atm, 8:44587 (R;SU;In Russian)
Buelt, J.L., Aging test results of an asphalt membrane liner, 8:43346 (R;US)
Buesing, J.W., Honeycomb thermal shade development, 8:43627 (RA;US)
Buisson, J.P., Intrinsic interface states as extended deep traps: Ge/GaP and Si/GaP, 8:44291 (J;US)
Bukhanov, V.M., Orientational dependence od secondary ion emission in the direction of close packing, 8:44866 (RA;SU;In Russian)
Bukki, S.M., Amplitude spectra formation in the GaAs radiation detectors, 8:44616 (RA;SU;In Russian)
Bulpitt, W.S., *See* Dixit, B.S., 8:43474
Bulyginskij, D.G., High-frequency plasma heating in tokamak FT-1 at overcritical density. II., 8:45116 (RA;CS;In Russian)
See Baranov, Yu.F., 8:45115
Bundgaard, J., Write-up for the diffractometer D1 at Risoe, 8:44640 (R;DK)
Bunker, M.E., *See* Dreesen, D.R., 8:43347
Burchard, W.G., *See* Schmeling, E.L., 8:44238
Burek, A.J., Crystal-diffraction system for spectroscopy, imaging, and interferometry of inertially confined fusion targets. Final report for the period ending January 1, 1983, 8:45213 (R;US)
Burger, C.P., Photoelastic study of the effects of an impulsive seismic wave on a nuclear containment vessel, 8:43855 (R;BR)
Photothermoelastic simulation of transient thermal stresses, 8:44418 (R;BR)
Burger, L.L., *See* Bray, L.A., 8:43375
Burke, D.G., *See* Cizewski, J.A., 8:45019
Burke, D.L., *See* Loehr, B., 8:44928
Burke, R., Overview of the National Passive Solar Products Program, 8:43621 (RA;US)
Burleson, G.R., Csub(LL)=(L,L;0,0) measurements and a structure due to a P partial wave in the pp system, 8:44927 (J;NL)
See Greene, S.J., 8:44980
Burman, C., *See* Shastry, S., 8:45008
Burnay, S.G., Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution, 8:43340 (R;GB)

Burnette, C., Philadelphia Solar Planning Project, 8:43489 (RA;US)
Burnham, J.B., Probabilistic analysis of alternative strategies for US FBR development, 8:43813 (R;US)
Burns, D., *See* Baker, B., 8:44055
Burns, T.J., Dynamic instability in adiabatic thermoplastic shear, 8:44196 (R;US)
Burris, A.E., Technology transfer to the East: an annotated bibliography for 1976 to 1981, 8:43981 (R;US)
Burton, F.G., *See* Cline, J.F., 8:43390
Burtsev, V.A., *See* Babalin, A.I., 8:45231
Burwell, C.C., Industrial electrification trend shows strength, 8:44045 (J;US)
Busani, J., Accelerating field spectrometer for photons and electrons simultaneous measurement. Application to decay schemes study, 8:44564 (R;FR;In French)
Busch, G.E., *See* Vavra, P.C., 8:45214
Busche, R.M., Recovery of acetic acid from dilute acetate solution, 8:43523 (J;US)
Busick, D.D., Personnel neutron dosimetry at SLAC, 8:45060 (R;US)
Bustany, P., Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine, 8:44761 (R;FR)
Busza, W., *See* Barton, D.S., 8:44922
Butcher, T.A., Evaluation of the low-temperature heat-exchanger fouling problem. Phase I report. Literature review and work plan, 8:44061 (R;US)
Butler, J.L., On-farm biomass program, 8:43506 (RA;US)
Bychkov, V.M., Analysis of the recommended threshold reaction cross sections from the BOSPOR-80 library using integral experiment data, 8:44995 (RA;SU;In Russian)
Bykov, V.I., Intensity losses at H^- ion acceleration in the cyclic accelerators at low and medium energies, 8:44551 (R;SU;In Russian)
Bykovskij, Yu.A., *See* Anan'in, O.B., 8:44548
See Arzumanyan, G.M., 8:44602
Byrns, R.A., Cryopump operations with the tokamak neutral beam injector prototype, 8:45274 (BA;US)
Bystritskij, V.M., Liquid-tritium target for mesoatomic and mesomolecular experiments, 8:44544 (R;SU;In Russian)

C

Cabanis, E., *See* Baron, J.C., 8:44762, 8:44764, 8:44765
Cable, J.H., Potential for solar applications in DOE's Building Energy Performance Standards Program, 8:43552 (RA;US)
Cable, M.D., *See* Wouters, J.M., 8:45006
Caffrey, A.J., *See* Jones, S.E., 8:45215
Calahan, D.A., *See* Martin, W.R., 8:45283
Caldwell, S.E., *See* Allison, S.W., 8:44639
Caligiuri, R.D., Low temperature sensitization of weld heat-affected zones in Type 304 stainless steel, 8:44176 (RA;US)
Callcott, T.A., *See* Little, J.W., 8:44837
Callen, J.D., *See* Shaing, K.C., 8:45177
Camargo, C.T.M., First accident simulation of Angra-1 power plant using the ALMOD computer code, 8:43913 (RA;BR;In Portuguese)
Cambiaggio, M.C., Comparison of upper and lower bound methods using a soluble many-Fermion model, 8:45032 (J;US)
Campbell, D.K., *See* Fesser, K., 8:44260
Campbell, H.L., Retrofit of a package boiler to utilize producer gas, 8:43730 (RA;US)
Campbell, S.A., *See* Behroozi, F., 8:44247
Campisano, S.U., Dechanneling by extended defects, 8:44148 (RA;SU)
Canfield, T.R., Stresses near waste canisters buried in salt, 8:43383 (R;US)
Cannon, J.A., Overview of pollution control requirements for the US gasification industry, 8:43267 (RA;US)
Cannon, M., Background pattern removal by power spectral filtering, 8:45090 (J;US)
Cantin, M., *See* Rocchia, R., 8:44563
Caponi, M.Z., *See* Arnush, D., 8:45211
Carajilescov, P., *See* Braga, C.V.M., 8:43772
See Graca, M.C., 8:44422
Carbiener, W.A., National waste terminal storage program: progress and status, 8:43387 (J;US)
Cardoso, H.P., *See* Venkataraman, N.S., 8:44414
Cardoso, P.E., *See* Pinheiro, R.B., 8:43831
Caretto, A.A. Jr., *See* Clark, J.L., 8:45021
Carey, R.W., Use of ORACLE in a scientific environment, 8:45265 (R;US)
Carleton, H.R., *See* Parker, J.H., 8:43196
Carlson, C.E., Meson, baryon, and glueball masses in the MIT bag model, 8:44943 (J;US)
Carlson, D.G., *See* Shui, V.H., 8:43214, 8:43215
Carlson, T.A., *See* Fahlman, A., 8:44894
Carlsson, H., *See* Nelson, P.H., 8:43362
Carlsten, J.L., Transient effects and pump depletion in stimulated Raman scattering, 8:44399 (R;US)
Carne, A., *See* Liem, H., 8:43201
Carne, T.G., Modal identification of a rotating-blade system, 8:43721 (R;US)
Caro, R.G., *See* Harris, S.E., 8:44631
Carossi, J.C., *See* Grimont, B., 8:44562
Carpenter, J.A., KWIC Index for Numerical Linear Algebra, 8:45305 (R;US)
Carr, R., *See* Eberhardt, W., 8:44896
Carr, W.J., *See* Crowe, B.M., 8:43356
Carruthers, P., Role of the phonon in the quantum-chromodynamical plasma, 8:44951 (J;US)
Carter, G., *See* Donnelly, S.E., 8:44874
See Tanovic, L.A., 8:44142
Carubelli, A., *See* Srinivasan, S., 8:44054
Carusone, J., Passive and hybrid solar manufactured housing and buildings. Phase I, 8:43565 (RA;US)
Case, A.L., Electronic method for autofluorography of macromolecules on two-d matrices, 8:44648 (P;US)
Case, C.W., Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982, 8:44051 (R;US)
Casper, T.A., *See* Grubb, D.P., 8:45169, 8:45170
See Simonen, T.C., 8:45187
Casperson, R.L., Analytical and experimental investigation of the Trombe wall, 8:43568 (RA;US)
Cassidy, G.B., Industrial-waste-management information for 1982 and record-to-date, 8:44707 (R;US)
Cassing, W., Scattering with absorptive interaction: Energy-dependent potentials, 8:45030 (J;US)
Castaigne, P., *See* Baron, J.C., 8:44762, 8:44764
Casten, R.F., Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry, 8:45022 (J;US)
See Warner, D.D., 8:45011
Castle, J.G. Jr., *See* Armendariz, M.G., 8:44626
Castleman, A.W. Jr., *See* Peterson, K.I., 8:44884
Caswell, W.E., Matter-antimatter transition operators: A manual for modeling, 8:44958 (J;NL)
Cataldo, D.A., *See* Cline, J.F., 8:43390
Catan, M., Brookhaven solar-heat-pump simulator: technical description and experimental results, 8:43547 (R;US)
Cates, M.R., *See* Allison, S.W., 8:44639
Catto, P.J., Catto and Myra respond:, 8:45191 (J;US)
Reduction of radial losses in bumpy tori, 8:45162 (J;US)
See Myra, J.R., 8:45159
Cawthon, L., *See* Wang, H.Y., 8:43462
Cecchi, J.L., *See* Knize, R.J., 8:44296
Cerf, J., *See* Benerech, G., 8:43874
Cerny, J., *See* Wouters, J.M., 8:45006
Cerrina, F., *See* Krause, M.O., 8:44895
Ceschini, L.J., *See* Bamford, W.H., 8:43779
Chaffin, R.J., Thermally induced switching and failure in p-i-n RF control diodes, 8:44460 (J;US)
Chahroudi, D., Weather Bubble, 8:43634 (RA;US)
Chakraborty, B., Electron and positron response to atomic defects in solids: A theoretical study of the monovacancy and divacancy in aluminum, 8:44216 (J;US)
Chakraverty, C., *See* Varughese, C.K., 8:43204
Chan, B.L., *See* Wood, B.J., 8:43170
Chan, C., Electron temperature differences and double layers, 8:45183 (J;US)
Chan, T., Numerical modeling to assess possible influence of the mine openings on far-field in-situ stress measurements at Stripa, 8:43361 (R;US)
Chan, V.S., Radio-frequency wave enhanced runaway production rate, 8:45179 (J;US)
Chang, C.H., Constraints from unification of interactions in a class of composite models, 8:44960 (J;NL)
Chang, E., *See* Liu, H.C., 8:44234
Chang, J., *See* Fehl, D.L., 8:45272
Chang, Y., *See* Dalder, E.N.C., 8:45262
Charnatski, V., *See* Slapa, M., 8:44615
Chason, M.K., *See* Smedskjaer, L.C., 8:44230
Chan, L.L., Hidden-symmetry algebra for the self-dual Yang-Mills equation, 8:44961 (J;NL)

Chawla, T.C., Solution of convection-dominated flows, 8:45279 (J;US)
Chen, C.T., Calculation of the SHG coefficients of $NaNO_2$ crystals by using CNDO/S method, 8:44344 (TJ;US)
Chen, H., *See* Grebogi, C., 8:45166
Chen, H.S., *See* Chuang, S.Y., 8:44232
Chen, J.C., *See* Evans, D.G., 8:44429, 8:44430
Chen, L.F., Enzymatic hydrolysis of cellulose pretreated with zinc chloride and hydrochloric acid, 8:43517 (J;US)
Chen, S.L., NO sub (x) formation from different coal types in a bench scale reactor under excess air and staged combustion conditions. Final report, 8:43264 (R;SE)
Chen, Y., Hydrogen in MgO crystals thermochemically reduced at very high temperatures, 8:44261 (R;US)
Cheng, S.S., *See* Cross, W.H., 8:43446
Cherepin, V.T., Secondary ion emission from concentrated alloys and compounds, 8:44863 (RA;SU;In Russian)
Cherevatenko, A.P., *See* Belov, A.G., 8:44545
Cherry, K., *See* Evgrafov, G.N., 8:44632
Cherry, M.L., Multiple muons in the Homestake underground detector, 8:44830 (J;US)
Chester, P.F., Acid rain, catchment characteristics and fishery status, 8:44732 (RA;DK)
Chetvertkov, V.I., *See* Pecherskij, O.P., 8:44478
Chevion, M., *See* Shinar, E., 8:44758
Chian, E.S.K., *See* Cross, W.H., 8:43446
Child, W.C. Jr., Raman and visible-ultraviolet spectra of polyhalide anions in molten I_2/KI-LiI, I_2/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8:44340 (J;US)
Chill, J.L., Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8:44134 (R;US)
Chin-Fatt, C., *See* Bruhns, H., 8:45184
Chipman, D., *See* Takahashi, T., 8:44742
Chiu, D., *See* Asenjo, J.A., 8:43520
Chivkin, V.I., *See* Baluka, G., 8:44595
Cho, C.H., *See* Clements, L.D., 8:43430
Choi, D., *See* Horton, W., 8:45174
Chong, Y.P., *See* Bruhns, H., 8:45184
Chong-Kook Kim, Sterilization of topical products by cobalt-60. Coordinated programme in practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 August 1980 - 31 July 1981, 8:44792 (R;XA)
Chrien, R.E., *See* Gill, R.L., 8:45026
Christensen, D.C., Pyrochemical recovery of plutonium fluoride reduction slag, 8:43358 (R;US)
Christiansen, K.A., Detection of traps in high conductivity ZnSe by optical transient capacitance spectroscopy, 8:44290 (J;US)
Christophorou, L.G., Isotope dependence of the breakdown strength of gases, 8:44294 (J;US)
Chu, T.K., *See* Stevens, J., 8:45152
Chu, T.Y.J., *See* Ruane, R.J., 8:43211
Chuang, S.Y., Detection of phase transitions in $NaNO_3$ crystals by positron annihilation, 8:44320 (BA;NL)
Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g), 8:44232 (BA;NL)
Chui, S.T., Solitons in quantum-spin systems, 8:44225 (J;US)
Chun, C.S.L., *See* Khan, M.R., 8:44204
Chung, H.M., High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8:43899 (R;US)
Chupanova, L.I., *See* Brazulev, D.P., 8:44535
Chursin, G.P., *See* Dekhtyar, I.Ya., 8:44165
See Ibragimov, Sh.Sh., 8:44273
Chuvilin, D.Yu., *See* Aleksandrov, V.D., 8:45056
Chuyanov, V.A., *See* Alekseev, Yu.A., 8:45223
Chvartatskij, P.V., *See* Sivkova, G.N., 8:45235
Chvartatskij, R.V., *See* Samojlenko, V.D., 8:45232
Chynoweth, D.P., Kinetics and advanced digester design for anaerobic digestion of water hyacinth and primary sludge, 8:43447 (J;US)
Ciegler, A., *See* Han, Y.W., 8:43519
Cintra Filho, J.deS., Utilization of axisymmetrical models in the description of the fluctuating temperature field and in the calculation of turbulent thermal diffusivity, 8:44421 (R;BR;In Portuguese)
Cizewski, J.A., Single proton structure of /sup 193,195,197/Ir and perturbed spin(6) symmetry, 8:45019 (J;US)
Claar, T.D., *See* Petri, R., 8:43651
Claesson, T., *See* Ronge, B., 8:43972
Clark, B.C., Dirac-equation impulse approximation for intermediate-energy nucleon-nucleus scattering, 8:44996 (J;US)
Clark, G., *See* Doderer, E., 8:43618
Clark, J.L., Energy deposition accompanying pion double charge exchange: Radiochemical study of the $^{209}Bi(\pi^+,\pi^-xn)$/sup 209-x/At reactions, 8:45021 (J;US)
Clark, R.E.H., Quantum-defect and distorted-wave theory applied to the resonance contribution of inelastic electron scattering, 8:44898 (J;US)
Clark, S.A., PIPIN users guide: a users guide to the omicron Data Aquisition system, 8:44623 (R;GB)
Clarke, J., *See* Koch, R.H., 8:44398
Clausen, E.C., Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8:43439 (R;US)
Production of organic acids from biomass by acid hydrolysis and fermentation, 8:43518 (J;US)
Clavelli, L., Neutral-current effects in quantum-chromodynamic four-jet production, 8:44940 (J;US)
Clawson, C.W., *See* Martoff, C.J., 8:44984
Clements, L.D., Development of an indirectly heated pyrolysis reactor, 8:43430 (RA;US)
Clendenin, J.E., *See* Sodja, J., 8:44479
Cleveland, B., *See* Cherry, M.L., 8:44830
Clinch, J.M., *See* Santini, D.J., 8:44652
Cline, J.F., Biobarriers used in shallow burial ground stabilization, 8:43390 (J;US)
Clinton, J.R., *See* Sebald, A.V., 8:43567
Cochran, R.A., Irvington Generating Station coal conversion project, 8:43727 (RA;US)
Coddington, P., *See* Gibson, I.H., 8:43896
Coester, F., Relativistic effects in the binding energies of few-body nuclei, 8:44969 (R;US)
Coffin, L.F., *See* Prater, T.A., 8:44188, 8:44189
Coggiola, M.J., Conversion of liquid-nitrogen traps to mechanical refrigeration, 8:44449 (J;US)
Cohen, B.I., Particle simulations of ion-cyclotron turbulence in a mirror plasma, 8:45161 (J;US)
Cohen, J.S., Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8:44899 (J;US)
Cohen, L.M., *See* Gat, N., 8:43161
Cohen, M.L., *See* Lam, P.K., 8:44211
See Northrup, J.E., 8:44214
See Yin, M.T., 8:44305
Cohen, R.H., Comment on tandem-mirror transport, 8:45190 (J;US)
Cokal, E.J., *See* Dreesen, D.R., 8:43347, 8:43348
Cole, S.T., *See* Atkinson, J.D., 8:43860
Cole, T.E., *See* Thomsen, M.F., 8:44833
Coleman, M.G., *See* Lesk, I.A., 8:43512
Coleman, P.G., *See* Chuang, S.Y., 8:44320
See Nash, J.K., 8:44322
Colligon, J.S., *See* Fischer, G., 8:44872
Collins, L.A., *See* Clark, R.E.H., 8:44898
Collins, N.E., Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts, 8:44026 (R;US)
Comar, D., *See* Baron, J.C., 8:44762, 8:44763, 8:44764
See Bustany, P., 8:44761
Congdon, J.D., Parental investment in the chicken turtle (Deirochelys reticularia), 8:44785 (J;US)
Connolly, J.F., *See* Bateman, J.E., 8:44777
Conrad, J.R., Design of pumped neutralizers for neutral beams using Monte Carlo methods, 8:45276 (J;US)
Constantin, M.J., Chromosome aberration assays in barley (Hordeum vulgare), 8:44809 (J;NL)
Introduction and perspectives of plant genetic and cytogenetic assays, 8:44808 (J;NL)
Converse, V.O., Monitoring and design study of the White Mountain School hybrid solar building, 8:43581 (RA;US)
Conzett, H.E., *See* Rioux, C., 8:44973
Cook, J.F., Qualification of automated techniques for meeting ASME code and NRC requirements, 8:43820 (R;US)
Cooper, C.A., *See* Bowring, R.W., 8:43897, 8:43898
Cooper, D.E., Scattering of light by laser fusion targets with small defects, 8:45273 (J;US)
Cooper, F., Aspects of supersymmetric quantum mechanics, 8:45088 (J;US)
Cooper, J., *See* Guillory, J., 8:43212

Cooper, W.A., Kinetic and fluid ballooning stability in anisotropic ion tokamaks, 8:45158 (J;US)
Coover, H.W. Jr., Energy: everybody's business, 8:44031 (RA;US)
Copic, M., *See* Trkov, A., 8:43842
Corbett, B.L., Oak Ridge Research Reactor quarterly report, October, November and December 1982, 8:43893 (R;US)
Corbett, J.D., *See* Guthrie, D.H., 8:44343
Corbett, W.E., Environmental issues and research program data needs suggested by the results of the Kosovo test program, 8:43232 (RA;US)
Corbett, W.T., *See* Kim, W.S., 8:44393
Corderman, R.R., Mass spectrometric studies of impurities in silane and their effects on the electronic properties of hydrogenated amorphous silicon, 8:44288 (J;US)
Cords, D., *See* Bartel, W., 8:44916
Cork, D.J., Acid-gas bioconversion favors sulfur production, 8:44781 (J;US)
Cornils, B., *See* Duerrfeld, R., 8:43151
Correia Filho, A., Solution of two energy-group neutron diffusion equation by triangular elements, 8:43845 (RA;BR;In Portuguese)
Cort, B., Effects of self-annealing and reirradiation on the specific heat of Nb_3Al, 8:44222 (J;US)
Cottingame, W.B., *See* Burleson, G.R., 8:44927
See Greene, S.J., 8:44980
Coussement, R., *See* Reinstema, S.R., 8:44149
Covington, H.R., Deep-drilling data, Raft River geothermal area, Idaho: Raft River geothermal production well No. 4, 8:43658 (R;US)
Cowan, R.D., *See* Kalne, E., 8:44892
Cowley, R.A., *See* Birgeneau, R.J., 8:44293
Cox, A.N., *See* Starrfield, S.G., 8:44828
Cox, T.E., Reactor-building-basement radionuclide and source distribution studies. Volume 3, 8:43910 (R;US)
Crabtree, G.W., *See* Behroozi, F., 8:44247
Craig, J., Varian gyrotron programs, 8:45208 (RA;US)
Crandall, D.H., *See* Gregory, D.C., 8:44891
Crandall, K.R., *See* Wangler, T.P., 8:44483
Crase, K.W., Beta dosimetry at a nuclear fuel separation facility, 8:44789 (R;US)
Crawford, H., Equilibrium charge states of uranium at relativistic energies, 8:44880 (R;US)
Crawford, H.J., LULU analysis program, 8:44553 (R;US)
Creutz, M., *See* Ardill, R.W.B., 8:44954
Crew, G.B., Internal modes in high-temperature plasmas, 8:45100 (R;US)
Crewe, A.V., Multiple sextupole system for the correction of third and higher order aberration, 8:44508 (P;US)
Cribier, D., *See* Farnoux, B., 8:43885
Croke, E.J., Federal laboratories as centers of excellence in the environmental sciences: a case study, 8:44002 (RA;US)
Croke, K.G., Research problems and issues in the application of land use controls to environmental protection, 8:43997 (RA;US)
Cronin, F.J., Analytical assumptions and causal ordering in interindustry modeling, 8:43989 (R;US)
Cross, J.C., *See* Barth, D.S., 8:43993
Cross, W.H., Anaerobic biological treatment of coal gasifier effluent, 8:43446 (J;US)
Crouzel, C., *See* Baron, J.C., 8:44763
Crowe, B.M., Status of volcanic hazard studies for the Nevada Nuclear Waste Storage Investigations, 8:43356 (R;US)
Crowley, J.S., Design and construction of three manufactured passive solar homes: a field test, 8:43563 (RA;US)
Crozier, E.D., EXAFS study of bromomanganate ions in molten salts, 8:44286 (J;US)
Crume, E.C. Jr., Simulation of inertial and beam-driven effects on impurities in tokamak plasmas, 8:45147 (R;US)
Cruz, S.A., Detailed analysis of the scope of the modified Firsov model, 8:45051 (J;US)
Csepregi, T., *See* Maschek, I., 8:44703
Cuderman, J.F., High-energy gas-fracturing develpoment. Annual report, April 1982-March 1983, 8:43296 (R;US)
Cuellar, J.P. Jr., *See* Rodriguez, C.F., 8:44127
Culberson, O.L., *See* Donaldson, T.L., 8:43515
Cullen, W.H., Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8:43752 (RA;US)
Fatigue crack growth rates of irradiated pressure vessel steels in simulated nuclear coolant environment, 8:43781 (RA;US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions I and II. Vol. 1, 8:43751 (R;US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8:44178 (R;US)
Cullen, W.H. Jr., *See* Toerroenen, K., 8:44180
Cumali, Z.O., Advanced techniques in passive solar analysis, 8:43596 (RA;US)
Cunningham, R.L., *See* Detroy, R.W., 8:43458
Curry, J.J., Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8, 8:43757 (R;US)
Curtice, D.H., An assessment of load frequency control impacts caused by small wind turbines, 8:43723 (J;US)
Curtis, J.N., Data Analysis through a Generalized Interactive Computer Animation Method (DATICAM), 8:45290 (R;US)
Cutrim, J.H.C., *See* Sterkel, H.P., 8:43856
Cutrone, M., *See* Jones, G.E. Jr., 8:43175, 8:43177
Cutshall, N.H., Direct analysis of ^{210}Pb in sediment samples: Self-absorption corrections, 8:44719 (J;NL)
Czauderna, N., Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8:43247 (R;DE;In German)

D

D'Agostini, G., Investigation of two photon final states in e^+e^- annihilation at $<\sqrt{5}> = 34.2$ GeV, 8:44919 (R;DE)
D'Alessio, G.J., *See* Mulloney, J.A., 8:43455
D'Oliveira, A.B., *See* de Amorim, E.S., 8:43806
D'yachkov, E.I., Refrigeration of pulsed superconducting magnets with coil parallel cooling by two-phase helium, 8:44536 (R;SU;In Russian)
Da Costa, D., *See* Grimont, B., 8:44562
da Fontoura Rodrigues, J.L.A., Calculation of two-dimensional thermal transients by the finite element method, 8:44426 (R;BR;In Portuguese)
da Silva, C.F., Synthesis method with finite elements for diffusion calculations, 8:43847 (RA;BR;In Portuguese)
da Silva, D.E., *See* da Silva, M.C., 8:43917
See Scharfmann, E., 8:43915
da Silva, M.C., Contribution to the study of two-phase flow analysis considering the existence of a dynamic flow between the phases, 8:43917 (RA;BR;In Portuguese)
da Silva Ferreira, R.T., *See* Altafini, C.R., 8:44905
See Von Linsingen, I., 8:44907
da Silva Ipojuca, T., *See* Fernandes, V.B., 8:43776
Dachs, H., *See* Axmann, A., 8:43887
Daehne, M., *See* Klein, H., 8:44522
Daglish, J., *See* O'Hara, F.A., 8:43345
Dahab, M.F., *See* Young, J.C., 8:43445
Dahl-Madsen, K.L., *See* Moeller, B., 8:44804
Dahlstroem, J.A., Right and left ventricular ejection fraction at rest and during exercise assessed with radionuclide angiocardiography, 8:44772 (R;SE;In Swedish)
Daido, H., Measurements of ablation pressure and mass ablation rate using a target pendulum and a thin foil target at 10 μm laser wavelength, 8:45226 (R;JP)
Pulse propagation properties in high-power CO_2 laser system for laser fusion, 8:45227 (R;JP)
Daikeler, G., *See* Koehler, D., 8:44771
Daider, E.N.C., Use of fusion-welding techniques in fabrication of a superconducting-magnet thermal-shield system, 8:45262 (R;US)
Dale, B.E., Freeze-explosion technique for increasing cellulose hydrolysis, 8:43516 (J;US)
See Moreira, A.R., 8:43470
Dalton, G.R., Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8:43329 (R;US)
Daniell, H., *See* Rebeiz, C.A., 8:43526
Daniels, R.J., *See* Grant, P.M., 8:44366
Daniels, W.J., *See* Grant, P.M., 8:44366
Daniels, W.R., *See* Ogard, A.E., 8:43359
Dao, P.D., *See* Peterson, K.I., 8:44884

Darken, L.A., High-resolution photothermal ionization spectroscopy of lithium-related shallow donors in germanium, 8:44215 (J;US)
Darling, S.L., Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8:43162 (R;US)
Darnell, J., Scoping study: molten salt solar electric experiment, 8:43539 (RA;US)
Darwish, F.A.I., *See* Pereira, L.C., 8:44140
Das, P., Two photon laser induced fluorescence of carbon atoms, 8:44882 (J;US)
See Brewer, P., 8:44881
Datlov, J., Hf apparatus for plasma heating at lower hybrid resonance on tokamak T-7, 8:45242 (RA;CS)
Lower-hybrid heating experiment on the TM-1-MH tokamak, 8:45117 (RA;CS)
See Stoeckel, J., 8:45122
Datta, R., Acidogenic bioconversion of C_1 compounds, 8:43522 (J;US)
Daugherty, D.P., *See* Voytko, J.D., 8:43449
Davenport, J.W., *See* Watson, R.E., 8:45073, 8:45074
Davids, C.N., *See* Ernst, H., 8:45010
Davidson, J.B., *See* Case, A.L., 8:44648
Davidson, R., Exact dynamics of a model for a three-level quantum system interacting with a continuous spectrum, 8:44886 (J;US)
Davies, T.J., *See* Allison, S.W., 8:44639
Davis, C.R., 60-MW/sub t/ methanation plant design for HTGR process heat, 8:43833 (R;US)
Davis, E.C., *See* Francis, C.W., 8:43221
Davis, F.H., *See* Santini, D.J., 8:44652
Davis, G., *See* Turner, A.P.F., 8:44059
Davis, H.G., Preliminary experiments on direct liquefaction of biomass by solvolysis and catalytic hydrogenation, 8:43438 (RA;US)
Davis, H.T., *See* Macosko, C.W., 8:43270
Davis, J., Geological reconnaissance and chronologic studies. Technical report No. 33, 8:44712 (R;US)
Davis, J.C., *See* Schneider, R.F., 8:43349
Davis, R.B., *See* Brakke, D.F., 8:44733
Davis, W.B., Passive solar: the 80's and the West, 8:43556 (RA;US)
Davis, W.D., *See* Armstrong, P.R., 8:44066
Davydov, V.A., *See* Binon, F., 8:44571
Dawson, J.M., Particle simulation of plasmas, 8:45189 (J;US)
Dawson, L.R., *See* Wiczer, J.J., 8:44315
Day, D.L., *See* Brumm, T.J., 8:43525
de Amorim, E.S., Sensitivity analysis of U^{238} cross sections in fast nuclear systems-SENSEAV-R computer code, 8:43806 (RA;BR;In Portuguese)
de Assis, J.T., *See* Leal, L.C., 8:43795
de Barcellos, C.S., *See* da Fontoura Rodrigues, J.L.A., 8:44426
de Boer, A.A., Wind energy in the Netherlands, 8:43668 (R;NL)
de Boer, F.W.N., *See* Alford, W.P., 8:45018
de Brito Aghina, L.O., *See* Oliveira, C.R.E., 8:43889
de Carvalho, J.F., Economical and strategical aspects of Brazilian-Germany nuclear agreement, 8:44016 (R;BR;In Portuguese)
de Faria, N.M., Some considerations on the Tlatelolco Treaty, 8:44024 (R;BR;In Portuguese)
de Filippi, R.P., Extraction of organics from aqueous solutions using critical-fluid carbon dioxide, 8:43468 (J;US)
de Goes Fischer, M.D., *See* de Faria, N.M., 8:44024
de Gouveia, A.S., *See* Ishiguro, Y., 8:43805
de Graaf, F.A.M., Energy from Meuse and Rhine. A systematic analysis, 8:43542 (R;NL;In Dutch)
de Lima, F.W., *See* Fulfaro, R., 8:43890
de Lima Moreira, Y.M., Nuclear power plants. Legal aspects - installation - construction - operation, 8:44023 (R;BR;In Portuguese)
de Marteau, J.M., Process for recovering uranium contained in phosphate compounds, 8:43326 (TG;US)
de Moura Neto, C., *See* do Amorim, E.S., 8:43888
de Oliveira, E.C., *See* de Amorim, E.S., 8:43806
de Oliveira, L.F.S., Probabilistic safety analysis : a new nuclear power plants licensing method, 8:43953 (R;BR;In Portuguese)
de Oliveira Barroso, A.C., *See* Alvim, A.C.M., 8:43921
See Madeira, A.A., 8:43773
de Oliveira Filho, O.B., *See* Venkataraman, N.S., 8:44414
de Oliverira Barroso, A.C., Applications of alternating direction methods to the solution of the heat conduction equation, with source, and in transient state, 8:44427 (R;BR;In Portuguese)
de Pina, C.M., Adjusts of control rod cross sections and its utilization in power distribution calculations for Angra-1 reactor, 8:43871 (RA;BR;In Portuguese)
de Socio, L.M., Slow forced and free convection in inclined channels, 8:44415 (R;BR)
Two-phase flow and heat transfer in cavities, 8:44410 (R;BR)
de Sousa, J.A., *See* Fulfaro, R., 8:43890
de Vasconcelos, H.F., Optimization of mechanical systems subjected to dynamic loadings, 8:44379 (R;BR)
Deakyne, M., *See* Cherry, M.L., 8:44830
DeAngelis, D.L., Model for the dispersal of seeds by animals, 8:44713 (R;US)
Dearborn, H., Solar greenhouse retrofit on roof of five-story tenment (low-income sweat equity coop) in East Harlem, N.Y.C., 8:43637 (RA;US)
DeCicco, S.G., Environmental regulation of the synfuel industry, 8:43268 (RA;US)
DeDuck, P.F., Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar, 8:43641 (RA;US)
Deeds, W.E., *See* Dodd, C.V., 8:43785
DeFacio, B., *See* Staudenmann, J., 8:44308
Deggim, D., Project study of prototype plant for the VEW-coal-conversion-process (pressure operation), 8:43147 (R;DE;In German)
Deitinghoff, H., *See* Junior, P., 8:44488
See Klein, H., 8:44522
Dejonghe, G., *See* Baur, A., 8:43758
Deju, R.A., Performance allocation traceable to regulatory criteria as applied to site-characterization work at the Basalt Waste Isolation Project, 8:43378 (R;US)
Dekhtyar, I.Ya., Effect of high-energy chemical bond-particle irradiation on electron-positron annihilation in deformed titanium alloys, 8:44165 (RA;SU;In Russian)
Positron interaction with radiation defects in W-Re alloys, 8:44164 (RA;SU;In Russian)
Dekhtyar, M.I., *See* Dekhtyar, I.Ya., 8:44164
del Aguila, F., *See* Gaillard, M.K., 8:44957
Delli, C., *See* Bertin-Maghit, G., 8:44629
DeMarini, D.M., Health effects studies, 8:43227 (RA;US)
Demartini, B.J., *See* Carey, R.W., 8:45265
DeMeo, E.A., EPRI conference proceedings: solar and wind power - 1982 status and outlook, 8:43536 (R;US)
Demichev, V.F., *See* Alekseev, Yu.A., 8:45223
DeMiglio, D.S., *See* Van Der Sluys, W.A., 8:43780
Demkin, N.A., *See* Makarov, A.A., 8:45065
Demuth, H., Methane drainage from coal seams by surface drillings, 8:43188 (R;DE;In German)
Demuth, R.B., *See* Adams, T.F., 8:43302
Denes, P., Production of positive pions by 800 MeV protons on carbon, 8:44986 (J;US)
Denison, M.R., *See* Gat, N., 8:43161
Denton, M.M., *See* Dreesen, D.R., 8:43347
Derkits, C., *See* Hazi, A.U., 8:44897
Derouin, C.R., *See* Srinivasan, S., 8:44054
Derrida, B., *See* Toulouse, G., 8:45064
Derstine, K.L., *See* Adams, C.H., 8:43797
DeSerio, F., Solar Cities and Towns Program, 8:43487 (RA;US)
DeSilva, A.W., *See* Bruhns, H., 8:45184
Desrosiers, A.E., *See* Moeller, M.P., 8:43948, 8:43964
Detroy, R.W., Fermentation of wheat straw hemicelluloses to ethanol by Pachysolen tannophilus, 8:43458 (J;US)
Deutsch, C., Ions stopping in dense and hot matter, 8:44841 (RA;DE)
Deutsch, W.J., *See* Blair, S.C., 8:43973
DeVeaux, J.C., A variance reduction technique for coulomb-nuclear thermalization of energetic fussion products in hot plasmas, 8:45193 (J;US)
Devillers, C., *See* Le Grand, J., 8:43880
DeWald, A.B., *See* Pellin, M.J., 8:45198
Dey, M., *See* Matin, M.A., 8:45033
Dharia, D., *See* Baker, B., 8:44055
Di Bona, G., *See* Babonneau, D., 8:44836
Diana, L.M., *See* Chuang, S.Y., 8:44320
See Nash, J.K., 8:44322
Dickerson, M.H., *See* Knox, J.B., 8:44691
Diebold, J., Ablative entrained flow fast pyrolysis status, 8:43433 (RA;US)
Diediker, L.D., Drilling history of core hole DB-15, 8:43379 (R;US)
Dieguez, J.A.D., *See* Bassel, W.S., 8:43771
Diehl, S.E., *See* Mnich, T.M., 8:44628
Dieterle, B.D., *See* Denes, P., 8:44986
Dietrich, G., *See* Bartel, W., 8:44916
Dietrich, Yu., Approach for calculations of the parameters of iion beams based

on the paraxial equation, 8:44496 (R;SU;In Russian)
Approach for calculations of the ion optical parameters of beams with high current density, 8:44497 (R;SU;In Russian)
Dike, G.A., *See* Ashley, C.M., 8:44064
Dikkers, R.D., Passive solar standards, performance criteria and code provisions, 8:43553 (RA;US)
Dikusar, N.D., *See* Govorun, N.N., 8:44583
Dillon, M.A., *See* Wang, R., 8:44336
Dinis, L.M.S., Quasi-estatic and dynamic elasto/viscoplastic analysis of plates and shells, 8:44384 (R;BR;In Portuguese)
Dionne, N., Tag gun conceptualization, 8:45206 (RA;US)
Diouri, M., *See* Boulaud, D., 8:44634
Dirner, A., *See* Glagolev, V.V., 8:44599, 8:44600, 8:44603
Dittmann, P., *See* Bartel, W., 8:44916
Ditzler, W.R., *See* Burleson, G.R., 8:44927
Divine, J.R., Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation, 8:43756 (R;US)
Dixit, B.S., Case study of a commercial small-scale wood-fueled steam boiler for textile mill operations, 8:43474 (BA;US)
Dmitrievskij, V.P., *See* Glazov, A.A., 8:44494
Dmyachenko, V.V., Investigation of lower hybrid resonance heating in tokamak FT-1 and FT-2, 8:45114 (RA;CS;In Russian)
do Amorim, E.S., Experimental fast reactors: self-sustained symetric and asymetric oscillations and viability as a source of pushed neutrons, 8:43888 (RA;BR;In Portuguese)
do Nascimento, J.A., Application of an automatic pattern recognition for aleatory signals for the surveillance of nuclear reactor and rotating machinery, 8:43749 (R;BR;In Portuguese)
do Valle Pereira Filho, H., *See* Nicolau, V.deP., 8:44906
Dobbs, D.R., Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9, 8:43801 (R;US)
Dobecki, T.L., Measurement of in situ dynamic properties in relation to geologic conditions, 8:43882 (J;US)
Dodd, C.V., Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982, 8:43785 (R;US)
Dodd, D.J.R., Coal-fired power generation in Ontario - A 60 year phenomenon coal ash disposal in Ontario. A 1000 year legacy, 8:43194 (RA;DK)
Dodds, S.A., *See* Brown, J.A., 8:44307
Doderer, E., Passive cooling and solar heating validation project to assist commercialization in warm humid climates, 8:43618 (RA;US)
Dodson, B.W., Monte Carlo simulation of shock-induced lattice damage, 8:45066 (R;US)
Post-shock chemical and ESR analysis of acrylamide and selected anthracene derivatives, 8:44351 (R;US)
Doe, T.W., Determination of the state of stress at the Stripa Mine, Sweden, 8:43363 (R;US)
Doering, H., *See* Jones, G.E. Jr., 8:43177
Doerr, W., *See* Pinheiro, R.B., 8:43831
Dolan, L.S., The economics of hardwood fuels produced on biomass plantations, 8:43513 (BA;US)
Dolbilov, G.V., Head model of SILUND-20 linear induction accelerator, 8:44476 (R;SU;In Russian)
Dolenc, D.A., *See* Chynoweth, D.P., 8:43447
Dolya, S.N., Simulation of ionization front forming at injection of relativistic electron beam in a gas chamber, 8:44549 (R;SU;In Russian)
Dombeck, T., *See* Denes, P., 8:44986
Dombek, F.S., *See* Barsell, A.W., 8:43879
Dominguez, R.R., *See* Berk, H.L., 8:45157
Donaldson, T.L., Potential for chemicals from biomass, 8:43515 (BA;US)
Donnelley, J.E., *See* Minton, J.A., 8:45314
Donnelly, J.R., Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8:43197 (RA;DK)
Donnelly, S.E., Ion bombardment induced evolution of inert gases trapped in solids, 8:44874 (RA;SU)
Donze, J.J., IV 5: all-electric drying of textile cloths, 8:44106 (TG;GB)
Dooley, W.T., Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a, 8:43906 (R;US)
Doran, J.C., Observations and models of simple nocturnal slope flows, 8:44657 (J;US)
Dorbrovolny, P., College Center, 8:43597 (RA;US)
Doremus, M.G., *See* Moreira, A.R., 8:43470
Dorn, D.W., *See* Maninger, R.C., 8:43416
Dorning, J.J., *See* Azmy, Y.Y., 8:45280
Dorozhkin, A.A., Auger electrons in the energy spectra of ion-electron emission, 8:44870 (RA;SU;In Russian)
Dorsey, J., *See* Schlueter, R.A., 8:43722
dos Santos, R.S., *See* de Oliverira Barroso, A.C., 8:44427
dos Santos Bastos, W., Comparative analysis of CARNAVAL II Library, 8:43804 (RA;BR;In Portuguese)
Dosch, R.G., Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8:43384 (R;US)
Douglas, G.S., Community-monitoring program surrounding the Nevada Test Site: one year of experience, 8:44696 (R;US)
Dover, C.B., Σ Hypernuclei, 8:44926 (J;US)
See Gibson, B.F., 8:44938
Dovland, H., *See* Schjoldager, J., 8:44681
Dow, J.D., *See* Buisson, J.P., 8:44291
Downey, S.P., *See* Sklarew, D.S., 8:44687
Downs, J.L., *See* Markowski, G.R., 8:43213
Dreesen, D.R., Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings, 8:43347 (R;US)
Research on the characterization and conditioning of uranium mill tailings. III. Summary of uranium mill tailings conditioning research and implications regarding remedial actions, 8:43348 (R;US)
Dreisbach, K., *See* Biasin, K., 8:44101
Dress, W., *See* Heckel, B., 8:45053
Drews, P., Operational behaviour of wind power plants. Pt. 1, 8:43696 (RA;DE;In German)
Drickamer, H.G., *See* Zurawsky, W.P., 8:44297
Drosselmeyer, E., Biological effects of radium, 8:44799 (R;DE;In German)
Drozdowicz, B., Natural ion concentration in air as an indication of atmosphere pollution by nanometer aerosol particle, 8:44656 (RA;DE)
Druehl, K., *See* Carlsten, J.L., 8:44399
Drummond, W.E., Study of transport mechanisms for energetic-ion heating of INTOR-size tokamaks. Final technical report, 2 June 1982-31 May 1983, 8:45098 (R;US)
Du Bois, P.J., *See* Minton, J.A., 8:45314
Duberg, J.A., *See* Frankel, M.L., 8:44086
DuBois, A.O., *See* Wilson, C.R., 8:44818
Duchemin, B., Decay heat calculations with the CEA radioactivity data bank and the code PEPIN, 8:43837 (R;FR;In French)
See Duco, J., 8:43881
Duck, I., *See* Umland, E., 8:44934
Duco, J., Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department, 8:43881 (BA;US)
Duedall, I.W., *See* Donnelly, J.R., 8:43197
See Parker, J.H., 8:43196
Duerrfeld, R., Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8:43151 (RA;US)
Duetting, S., *See* Simhan, K., 8:43688
Duffie, J.A., Simulation and design of solar energy systems, 8:43575 (RA;US)
Dunaway, P.B., Cleanup trial in the plutonium valley, 8:44722 (J;US)
Dunigan, J.J., *See* Kaiser, K.W., 8:43413
Dunlap, B.D., Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth), 8:44256 (J;GB)
Dunn, T.D., *See* Bender, D.M., 8:43909
Durham, W.F., *See* Barth, D.S., 8:43993
Dustin, M.O., Comparison of road-load-simulator test results with track tests on electric-vehicle propulsion system, 8:44126 (R;US)
Dvurechenskij, A.V., Formation and rearrangement of radiation defects in ion implanted semiconductors, 8:44275 (RA;SU;In Russian)
Dyatlov, V.G., *See* Volkov, Yu.F., 8:45237
Dymke, N., Method for unfolding high-energy scintillation gamma-ray spectra up to 8 MeV, 8:45309 (R;DD;In German)
Dyson, J.R., *See* Burnay, S.G., 8:43340
Dzhelepov, V.P., *See* Bystritskij, V.M., 8:44544
Dziubek, A.M., Treatment of alkaline wastewater from lignite-fired power plants, 8:43200 (RA;DK)

E

Eager, G.S. Jr., *See* Sosnowski, M., 8:44451

Earle, M.D., *See* Patterson, M.G., 8:44047, 8:44048

Ebecken, N.F., *See* Fonseca Neto, J.deD., 8:44380

Eberhardt, W., Persistent optical excitation to Rydberg states: Xe on Au, 8:44210 (J;US)
Site-specific fragmentation of small molecules following soft—x-ray excitation, 8:44896 (J;US)

Eckart, L., *See* Weisman, J., 8:43746

Eckhoff, N.D., Nuclear-fuel-cycle education: Module 1. Nuclear fuel cycle overview, 8:43330 (R;US)
See Dalton, G.R., 8:43329

Eckstein, W., *See* Matschke, F.E.P., 8:44852

Eddlemon, G.K., Potential ecological hazards of H-Coal liquefaction, 8:43222 (R;US)

Eddy, P.A., Ground-water surveillance at the Hanford Site for CY 1982, 8:44748 (R;US)

Efanov, A.D., Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8:43908 (R;SU;In Russian)

Efthimion, P., *See* Jobes, F., 8:45148

Egorov, O.K., *See* Gorichev, P.A., 8:44578

Ehlers, K.W., High-concentration H_3^+ or D_3^+ ion source, 8:44889 (J;US)

Ehrhardt, J., Accident consequences and risk assessments based on the probabilistic safety study of a nuclear power plant with a high temperature reactor (HTR-1160), 8:43927 (R;DE;In German)

Ehrhardt, K.D., Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500, 8:43922 (R;DE;In German)

Ehrlich, K., Representation of the simulation irradiation project, 8:44171 (RA;DE;In German)
See Boecking, G., 8:43923

Eichelberger, J.C., Magmatic model for the Mount St. Helens blast of May 18, 1980, 8:44816 (J;US)

Eichhorn, K., *See* Hubner, K., 8:44598

Eichler, R., *See* Bartel, W., 8:44916

Eidsvik, K.J., Prediction of hazard area resulting from a gas release, 8:43294 (R;NO)

Eigerman, M.R., Challenges that remain: can synfuel technology make it on the outside, 8:43160 (RA;US)

Eiselstein, L.E., *See* Caligiuri, R.D., 8:44176

Ekstroem, L.A., Thermal performance of solar collectors. Three years of outdoor exposure of eleven different products, 8:43647 (R;SE;In Swedish)

El-Ashry, M.Y., Kinetic theory of parametric resonance in relativistic plasma, 8:45108 (R;XA)

El-Bassioni, A., Applications of PRA in licensing, 8:43958 (BA;US)

El-Batanouny, M., Site determination for palladium on niobium using angle-resolved photoemission, 8:44217 (J;US)

Elbakian, S.S., *See* Atsagortsian, K.Z., 8:45104

Elfmann, W., Design concept for vessels and heat exchangers, 8:44383 (R;BR)

Elgasim, E.A., Development of a commercial feasible application of a hydrostatic meat tenderizer and demonstration of its efficacy. Final report, June 24, 1980-March 1, 1983, 8:44095 (R;US)

Eliason, J.R., Water system model development and applications within AEC and NASA laboratories, 8:44724 (RA;US)

Eliezer, S., Laser fusion (for pedestrians), 8:45220 (R;IL)

Elliott, D.C., Basic research in biomass direct liquefaction, 8:43437 (RA;US)

Ellis, R.F., Emission, absorption, and tunneling of whistler waves in an inhomogeneous magnetic field, 8:45178 (J;US)

Ellis-Akovali, Y.A., *See* Mlekodaj, R.L., 8:45013

Ellsaesser, H.W., Isolating the climatogenic effects of volcanoes, 8:44815 (R;US)
See Walton, J.J., 8:44690

Elmer, D., *See* Martin, M., 8:43612

Elsen, E., Experimental evidence for differences in <pperpendicular to> between quark jets and gluon jets, 8:44917 (R;DE)
Search for new heavy leptons at PETRA, 8:44918 (R;DE)

Elston, S.B., *See* Breinig, M., 8:44901

Embury, J.F., *See* Zardecki, A., 8:44694

Emel'yanov, A.I., *See* Babalin, A.I., 8:45231

Emin, D., Electrical and optical properties of amorphous thin films, 8:43527 (BA;US)
Small-polaron hopping in magnetic semiconductors, 8:45075 (J;US)

Emmett, J.L., Future development of high-power solid-state laser systems, 8:44408 (J;US)

Emory, B.B., Development of magnetic filters for the primary-coolant circuit of a PWR, 8:43788 (R;US)

Endo, H.K., *See* Wilson, C.R., 8:44818

Engler, J., Atomic and nuclear properties of materials, 8:45048 (R;DE)
See D'Agostini, G., 8:44919

Ensor, D.D., Selective laser excitation of terbium(III) in lanthanum(III) fluoride precipitates, 8:44330 (J;US)

Entingh, D.J., FORSITE, a multiple-project management system: overview and general description, 8:43653 (R;US)
See Bernstein, A.J., 8:43663
See Gerstein, R.E., 8:43659

Epler, J.L., *See* DeMarini, D.M., 8:43227

Epps, R., *See* Jensen, B., 8:44447

Erickson, R.A., *See* Sodja, J., 8:44479

Ernst, H., Prompt compound nuclear K X-rays in fusion reactions induced by a heavy projectile, 8:45010 (J;NL)

Erradi, L., Temperature effects studies in light water reactor lattices, 8:43767 (R;FR;In French)

Erzgraber, G., *See* Hubner, K., 8:44598

Esbensenm, H., Comparison of the semiclassical coupled channel theory of particle transfer with exact calculations, 8:45037 (J;US)

Esch, E.L., VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8:43745 (R;US)

Escher, G., *See* Langhoff, J., 8:43155

Escoda, M.C., *See* Long, M.B., 8:44369

Escott, J.J., *See* Stringer, R.P., 8:43230

Eskell, S., Lake Way uranium project, 8:43308 (R;AU)

Eskola, K., *See* Meyer, R.A., 8:45001

Espinat, Didier, Contribution to the study of reforming catalyst aging by coking, 8:43284 (R;FR;In French)

Estabrook, K., Parametric instabilities near the critical density in steepened density profiles, 8:45164 (J;US)
Theory and simulation of one-dimensional Raman backward and forward scattering, 8:45165 (J;US)

Estle, T.L., *See* Brown, J.A., 8:44307

Ethridge, C.D., *See* Nicholson, N., 8:43406

Evans, D., *See* Winter, S., 8:43636

Evans, D.G., Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 1. Main report and Appendices A-D, 8:44429 (R;US)
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 2. Appendix E, 8:44430 (R;US)

Evans, L.S., Biological effects of acidity in precipitation on vegetation: a review, 8:44811 (J;GB)

Evans, R.J., *See* Milne, T.A., 8:43434

Evdokimov, N.N., Induction pick-up of placement of electron beam centre of gravity, 8:44541 (R;SU;In Russian)

Evgrafov, G.N., Some characteristics of the CCD-321 instruments with charge connection, 8:44632 (R;SU;In Russian)

Exel, K., Swelling behavior of ferrites and austenites exposed to heavy ions, 8:44169 (RA;DE;In German)
See Boecking, G., 8:43923

Eyler, L., *See* Barnhart, J., 8:43255

F

Fabritsiev, S.A., Helium effect on the dislocation network structure in a high-nickel alloy, 8:44161 (RA;SU;In Russian)

Fahlman, A., Angular distribution of Xe 5s→εp photoelectrons: Disagreement between experiment and theory, 8:44894 (J;US)
See Krause, M.O., 8:44895

Fahrenbruch, A.L., *See* Huber, W., 8:44289

Fairweather, D.S., *See* Bateman, J.E., 8:44777

Falco, C.M., *See* Khan, M.R., 8:44204

Falcone, R.W., *See* Harris, S.E., 8:44631

Falgayrettes, M., *See* Bertin-Maghit, G., 8:44629

Falk, J., Measurement of laser beam divergence, 8:44406 (J;US)

Fallieros, S., *See* Friar, J.L., 8:44972

Falster, H., Dust emission, its quantity and composition, depending on dust collector; coal quality etc., 8:43207 (RA;DK)

Fan, L.T., *See* Lee, Y.H., 8:43461

Fang, H.Y., *See* Clements, L.D., 8:43430

Farber, W., *See* Betz, G., 8:44846
Farmery, B.W., *See* Thompson, M.W., 8:44844
Farnoux, B., New steady state medium flux neutron source, 8:43885 (R;FR)
Farny, Gerard, Immersed multipurpose device for the inspection of PWR spent pencils in a loop reloaded in the Osiris pool, 8:43883 (R;FR;In French)
Fateev, A.A., *See* Dolbilov, G.V., 8:44476
Faya, A.J.G., Heat conduction in a plate-type fuel element with time-dependent boundary conditions, 8:43864 (R;BR;In Portuguese)
Fedchenko, P.G., *See* Dekhtyar, I.Ya., 8:44164
Fedchenko, R.G., *See* Dekhtyar, I.Ya., 8:44165
Fedukov, S.V., *See* Zabolotin, V.P., 8:44495
Fedulin, V.N., Experimental study on hydrodynamics of the up-draught part of the VK-50 boiling water reactor, 8:43750 (R;SU;In Russian)
Fehl, D.L., Two-frame flash x-radiography device for the study of particle beam fusion target implosions, 8:45272 (J;US)
Fehler, M.C., *See* Pearson, C.F., 8:43655
Feigenbaum, M., Entropy balance for nonequilibrium steady states, 8:45091 (J;IT)
Feijoo, R.A., *See* Taroco, E., 8:43857
Fel'dmann, K., Texture analysis on the base of incomplete pole figures. Mathematical substantiation and the ICPOFI program description, 8:45300 (R;SU;In Russian)
Felcher, G.P., *See* Khan, M.R., 8:44204
Feldman, G., *See* Kuhlmann, E., 8:44992
Feldman, L.C., Surface scattering of MeV He^+ ions from W(100) and Si(100) monocrystals, 8:44856 (RA;SU)
Feldman, W.C., Electron velocity distributions near the earth's bow shock, 8:44834 (J;US)
See Thomsen, M.F., 8:44833
Feldmann, H.F., Gasification of forest residues in a high-throughput gasifier, 8:43427 (RA;US)
Feldt, W., Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors, 8:44747 (R;DE;In German)
Felst, R., *See* Bartel, W., 8:44916
Fenimore, E.E., Coded aperture imaging with self-supporting uniformly redundant arrays, 8:44649 (P;US)
Large symmetric π transformations for Hadamard transforms, 8:45095 (J;US)
Fenton, R.G., Slip-line field analysis of metal flow during two dimensional forging, 8:44378 (R;BR)
Fenyves, E.J., *See* Cherry, M.L., 8:44830
Ferchak, J.D., *See* Mitchell, R.W., 8:44783
Ferdinand, J., Diagnostics of nonequilibrium hydrogen plasma, 8:45131 (RA;CS)
Ferguson, J., *See* Guillory, J., 8:43212
Fernandes, E.C., *See* Vetterle, J.F., 8:44425
Fernandes, V.B., Anticipated simulation of Angra-1 start-up physical tests, 8:43776 (RA;BR;In Portuguese)
Fernandes Filho, T.L., Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8:43912 (RA;BR;In Portuguese)
Fernandez y Fernandez, E., *See* Graca, M.C., 8:44422
Ferrari, L.D.B., *See* Elfmann, W., 8:44383
Ferrell, T.L., *See* Little, J.W., 8:44837
Fesser, K., Optical absorption from polarons in a model of polyacetylene, 8:44260 (J;US)
See Bishop, A.R., 8:45086
Feucht, H., Effectiveness of testis cancer screening, 8:44760 (R;DE;In German)
Fiander, D.C., Kickers and septa for the fast extraction of the beams of HIBALL, 8:44524 (RA;DE)
Filippov, Yu.P., *See* Mamedov, I.S., 8:44428
Fillo, J.P., *See* Nakles, D.V., 8:43235
Findley, M.E., *See* Flanigan, V.J., 8:43426
Firor, K., *See* Hogan, S., 8:43509
Fischer, D.A., Reemitted-positron energy-loss spectroscopy: A novel probe of adsorbate vibrational levels, 8:44304 (J;US)
Fischer, G., Experimental and theoretical consideration of recoil implantation, 8:44872 (RA;SU)
Fischer, J.E., *See* Woo, K.C., 8:44258
Fischer, U., *See* Goel, B., 8:43849
Fishbone, L.G., *See* Hill, D., 8:44015
Fisher, K.J., *See* Bobrowicz, F.W., 8:45049
Fisk, Z., *See* Majkrzak, C.F., 8:44253
See Thompson, J.D., 8:44221
See Wire, M.S., 8:44213
Fissan, H., *See* Niessner, R., 8:44675
Fisyak, Yu.V., *See* Gumenyuk, S.A., 8:44572
Fitch, W.N., Environmental modeling of hydrologic systems, 8:44752 (RA;US)
FitzPatrick, J.A., Modelling and control of blackwater treatment in coal preparation, 8:43254 (R;US)
Fix, A., Stability calculations for cylindrical shells and folded systems using the method of finite elements, 8:44392 (R;DE;In German)
Fladmark, G.E., BETA3A user' s manual, 8:43274 (R;NO)
Flaim, T., *See* Hoock, S., 8:43678
Flanigan, V.J., Low-Btu gas from a small-scale fluidized bed reactor using sawdust feeds, 8:43440 (BA;US)
Steam gasification of wood in a fluidized bed using indirect heating with fire tubes, 8:43426 (RA;US)
Fleckenstein, V., *See* Picmaus, E., 8:43490
Fleming, R.H., *See* Wood, B.J., 8:43170
Flesher, A.C., *See* Bateman, J.E., 8:44777
Fletcher, J.G., Large computer facilities, 8:45288 (RA;US)
Flexser, S., *See* Wollenberg, H., 8:44817
Florian, T., *See* Metzger, W., 8:44236
Fluegge, G., *See* D'Agostini, G., 8:44919
Fluss, M.J., *See* Smedskjaer, L.C., 8:44230, 8:44235
Flynn, E.R., *See* Alford, W.P., 8:45018
See Cizewski, J.A., 8:45019
Flynn, K.F., *See* Wynveen, R.A., 8:44697
Fogaca Filho, N., Post irradiation examination on test fuel pins for PWR, 8:43770 (R;BR;In Portuguese)
Foias, C., Number of modes governing two-dimensional viscous, incompressible flows, 8:44910 (J;US)
Fomin, I.P., *See* Pinos, I.B., 8:45145
Fomin, S.P., *See* Akhiezer, I.A., 8:45047
Fomin, V.I., *See* Zaletin, V.M., 8:44617
Fonseca Neto, J.deD., Lower bounds of collapse loads in axisymmetrical vessels, 8:44380 (R;BR;In Portuguese)
Ford, A., Summary of the workshop on regulatory-financial models of the US electric utility industry, 8:44044 (R;US)
Ford, F.P., Mechanism of environmentally-controlled crack-growth of structural steels in high-temperature water, 8:44185 (RA;US)
Ford, L.H., *See* Saum, C.J., 8:43364
Forestier, A., Finite element method for an ultra compressible flow, 8:43853 (R;FR)
Forrest, J.E., *See* Atkinson, J.D., 8:43860
Forssten, K., *See* Meyer, R.A., 8:45001
Forster, C.B., Field assessment of the use of borehole pressure transients to measure the permeability of fractured rock masses, 8:43360 (R;US)
Forsyth, E.B., Brookhaven superconducting power transmission system, 8:44397 (J;US)
Forsyth, J.M., LLE Review. Quarterly report, July 1982-September 1982, 8:45212 (R;US)
Forte, M., *See* Heckel, B., 8:45053
Fortin, X., *See* Babonneau, D., 8:44836
Fortmann, C., *See* Huber, W., 8:44289
Fortune, H.T., *See* Greene, S.J., 8:44980
Forziati, A.F., EPA measurements and instrumentation program, 8:43999 (RA;US)
Fossati, C., *See* Gabetta, G., 8:44184
Foti, G., *See* Campisano, S.U., 8:44148
Fourguette, D.C., *See* Long, M.B., 8:44369
Fowler, R.H., *See* Rome, J.A., 8:45195
Fox, M.J., *See* Caligiuri, R.D., 8:44176
Fox, R.J., Measurement of peak temperature along an optical fiber, 8:44650 (J;US)
Fradin, F.Y., *See* Kumagai, K., 8:44252
Fraker, H., Princeton Professional Park (PPP): design for heating, cooling, and daylighting, 8:43606 (RA;US)
See Prowler, D., 8:43620
See Snyder, M.K., 8:43594
Fraley, D.W., *See* Burnham, J.B., 8:43813
Francis, C.W., Coal conversion solid waste disposal, 8:43221 (J;US)
Solid waste management, 8:43219 (RA;US)
Frank, D.N., Head assembly for multiposition borehole extensometer, 8:44651 (P;US)
Franke, W., *See* Laude, H., 8:43681
See Tetzlaff, G., 8:43672
Frankel, M.L., Evaluation of the home-energy-rating concept and the Massachusetts Pilot Project, 8:44086 (R;US)
Franklin, A.L., Information manual for the institutional conservation program, 8:44085 (R;US)
Franks, L.A., *See* Allison, S.W., 8:44639
Frantzis, L., *See* Vachon, W.A., 8:43710
Frazier, M., Power-line-induced AC potential on natural-gas-pipelines for complex rights-of-way configurations. Volume 3. Computer program user's guide. Final report, 8:43298 (R;US)
Fredriksson, U., Classification of the wind of two areas in the district of Halland, 8:43717 (R;SE;In Swedish)
Freedman, A.P., Portable fluxgate magnetometer for non-invasive

measurement of occupationally acquired lung dust. Progress report, September 15, 1982-September 14, 1983, 8:44766 (R;US)
Freedman, B., *See* Cooper, F., 8:45088
Freeman, W.S., *See* Ernst, H., 8:45010
Freese, K., Massive, degenerate neutrinos and cosmology, 8:44829 (J;US)
Frei, H., Selective vibrational excitation of the ethylene—fluorine reaction in a nitrogen matrix. II, 8:44352 (J;US)
Freihaut, J.D., *See* Seery, D.J., 8:43191
Freire, C.F., Analysis of the loss of coolant accident due to open failure in the pressurizer relief valve, for Angra-1 reactor, 8:43918 (RA;BR;In Portuguese)
Freire, J.L.F., *See* Taroco, E., 8:43857
Fremiot, C., *See* Puill, A., 8:43762
French, R.R., Lake Way uranium deposit, 8:43307 (R;AU)
See Eskell, S., 8:43308
Freshley, M.D., *See* Russcher, G.E., 8:43937
Frey, D., *See* Meier, H.E., 8:44120
Friar, J.L., Classification of exchange currents, 8:45031 (J;US)
Electric polarizability of the deuteron, 8:44972 (J;US)
Threshold pion photoproduction from the trinucleon, 8:44947 (J;NL)
Fried, S.M., *See* Vandegrift, G.F., 8:43393
Friedlander, E.M., Anomalous reaction mean free paths of nuclear projectile fragments from heavy ion collisions at 2A GeV, 8:44982 (J;US)
Frier, W.A., *See* Swisher, J.H., 8:43976
Fries, D.C., *See* D'Agostini, G., 8:44919
Fries, S., Comparative study of the operational behaviour of wind power plants of power class 10 kW, 8:43684 (RA;DE;In German)
Frieze, W.E., *See* Fischer, D.A., 8:44304
See Schultz, P.J., 8:44205
Fritzsche, A., Development and testing of a 20 kW vertical rotor (Phase 1), 8:43705 (RA;DE;In German)
Froehlich, R., *See* Tahir, N.A., 8:44532
Frost, L., Valence electron momentum distributions in cadmium, 8:44839 (R;AU)
Fruchter, E., An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures, 8:43649 (J;GB)
Fruehauf, H.J., *See* Biasin, K., 8:44101
Fues, W., *See* D'Agostini, G., 8:44919
Fuhlrott, H., Subcritical fatigue crack growth under combined primary and secondary loads, 8:44190 (RA;US)
Fujita, H., *See* Daido, H., 8:45226, 8:45227
See Ozaki, T., 8:45110
Fuka, M.A., RSX system development under VAX/VMS compatibility mode, 8:44552 (R;US)
Fukuda, K., Migration behaviour of fission products in and from spherical HTR fuel elements (SAPHIR loop experiments in the PEGASE reactor), 8:43848 (R;DE)
Fulfaro, R., Experience and research with the IEA-R1 Brazilian reactor, 8:43890 (R;BR)
Fuller, E.G., *See* Friar, J.L., 8:44972
Funtikov, Yu.V., *See* Komlev, V.P., 8:44576
Furieri, E.B., Protection set-points lines for the reactor core and considerations about power distribution and peak factors, 8:43778 (RA;BR;In Portuguese)

G

Gabetta, G., Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8:44184 (RA;US)
Gaddy, J.L., *See* Clausen, E.C., 8:43439, 8:43518
Gaehler, R., *See* Heckel, B., 8:45053
Gaertner, C., Impact of cofactors and inhibitors on DNA repair synthesis after γ-irradiation in semi-permeable Escherichia coli cells, 8:44795 (R;DE;In German)
Gaffuri, G., *See* de Socio, L.M., 8:44410
Gagliardi, C.A., $0^+ \rightarrow 0^-$ beta decay of ^{16}C, 8:44987 (J;US)
Gaillard, M.K., Light scalars in N=1 locally supersymmetric theories, 8:44957 (J;NL)
Gajsak, I.I., On-line electronic system for a multilayer semiconductor spectrometer, 8:44588 (R;SU;In Russian)
Gal, A., *See* Dover, C.B., 8:44926
Gal'perin, A.G., *See* Anan'eva, M.A., 8:44582
Galbraith, H.W., *See* Milonni, P.W., 8:44407
Galbraith, R.M., *See* Wilson, C.R., 8:44818
Gale, J.E., *See* Forster, C.B., 8:43360
Gallagher, D.W., *See* Curry, J.J., 8:43757
Gallhoff, U., Development of the seam, 8:43251 (R;DE;In German)
Gallimore, R., *See* Boggio, G., 8:44011
Gamerdinger, K., *See* D'Agostini, G., 8:44919
Gann, V.V., Damaging channeling, 8:44157 (RA;SU;In Russian)
Hypersonic wave emission by channeling particles, 8:45046 (RA;SU;In Russian)
Ganssauge, E., *See* Friedlander, E.M., 8:44982
Garcia, A. III, Design, analysis, and test verification of advanced encapsulation systems. Triannual report for period ending 31 March 1983, 8:43494 (R;US)
Development of metallization process: FSA project, cell and module formation research area. Quarterly technical progress report No. 6329-12 for the period ending March 31, 1983, 8:43496 (R;US)
Garcia-Torano, E., *See* Grau, A., 8:44579
Gardner, C.L., 't Hooft—Polyakov monopole near the Prasad—Sommerfield limit, 8:44959 (J;US)
Gardstein, C., *See* Winter, S., 8:43636
Gartner, K., Cross section of elastic scattering of ions on atoms, 8:44843 (RA;SU)
Garvey, D.B., In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 4. Federal Regions VIII, IX, and X, 8:44658 (R;US)
Garvey, G.T., *See* Gagliardi, C.A., 8:44987
Gary, S.P., *See* Feldman, W.C., 8:44834
See Thomsen, M.F., 8:44833
Gary-Bobo, C.M, *See* Louni, L., 8:44757
Gasparini, R., Water quality and the discharge of cooling water into rivers, lakes and coastal waters, 8:44750 (RA;DK)
Gat, N., Coal pyrolysis under rapid heating with a c-w laser, 8:43161 (R;US)
Gathers, G.R., Hugoniot measurements in vanadium using the LNL two-stage light-gas gun, 8:44201 (R;US)
Properties of hot expanded liquid aluminum, 8:44200 (R;US)
Ge, M.L., *See* Chau, L.L., 8:44961
Gebler, H., Calculation of reliability characteristics for electric power supply networks, 8:43738 (R;DE;In German)
Gebrin, A.N., *See* de Oliverira Barroso, A.C., 8:44427
Geesaman, D.F., Inelastic scattering of 162-MeV pions by ^{14}N, 8:44985 (J;US)
Gehlen, G.V., *See* Clavelli, L., 8:44940
Gehrke, R.J., *See* Greenwood, R.C., 8:45014
Gehrs, C.W., Environmental effects of coal gasification, 8:43263 (RA;US)
Geissel, H., Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8:45041 (RA;DE)
Gelbard, E.M., Improved iterative method for solution of fully implicit thermal-hydraulics equations, 8:45278 (J;US)
Gelberg, A., *See* Meyer, R.A., 8:45001
Geldmacher, H., *See* Krischke, H., 8:43257
Gelletly, W., *See* Warner, D.D., 8:45011
Gemmell, D.S., *See* Vager, Z., 8:44900, 8:44902
Gentle, T.M., Silane surface chemistry of palladium: synthesis of silaethylene, silacyclobutadiene, and silabenzene, 8:44339 (J;US)
Gentry, R.A., *See* Allison, S.W., 8:44639
Genzel, H., *See* Berger, C., 8:44915
George, L.L., Probability problems in seismic risk analysis and load combinations for nuclear power plants, 8:43952 (R;US)
See Lim, E.Y., 8:43966
Gerding, T.J., *See* Vandegrift, G.F., 8:43393
Gerhard, A., *See* Klein, H., 8:44522
Gerich, C.A., National Mirror Fusion Program Plan, 8:45259 (R;US)
German, U., *See* Yona, S., 8:44621
Gerscha, A., Experience with an autoclave-refreshing system for crack growth measurements under PWR- and BWR-environmental conditions, 8:43753 (RA;US)
Gerstein, R.E., Geothermal Progress Monitor: system status and operational experience, 8:43659 (R;US)
See Bernstein, A.J., 8:43663
See Entingh, D.J., 8:43653
Gerstl, S.A.W., *See* Zardecki, A., 8:44694
Gertenbach, W.P., Investigation into the organisation and structural design of multi-computer process-control systems, 8:44633 (R;ZA)
Gessiness, B., *See* Lower, C.W., 8:43407
Gharpuray, M.M., *See* Lee, Y.H., 8:43461

Ghosh, S., *See* Chynoweth, D.P., 8:43447
Gibbons, J.W., *See* Congdon, J.D., 8:44785
Gibs, V., Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures, 8:43810 (R;DE;In German)
Gibson, B.F., Binding energy estimates for charmed few-body systems, 8:44938 (J;US)
Gibson, I.H., UK MT-3 ballooning test in the Battelle NRU loop, 8:43896 (R;GB)
Giddings, A.E., *See* Kim, W.S., 8:44393
Gido, R.G., Hydrogen-burn analyses of ice-condenser containments, 8:43942 (R;US)
Giess, B., Contribution of wind energy to the energy balance of a combined solar-wind power station, 8:43686 (RA;DE;In German)
Gigliotti, F., *See* Voytko, J.D., 8:43449
Gikal, B.N., *See* Anan'in, O.B., 8:44548
Gilbert, R.O., TRAN-STAT: (statistics for environmental studies), Number 23, April 1983, 8:44718 (R;US)
TRAN-STAT: statistics for environmental studies, 8:45306 (R;US)
TRAN-STAT: statistics for environmental studies, No. 18, January 1982, 8:45307 (R;US)
TRAN-STAT (statistics for environmental studies) Number 20, May 1982, 8:45308 (R;US)
Gill, R.L., Levels in ^{148}Ce from the decay of mass separated ^{148}La, 8:45026 (J;US)
Gill, S., VIS product development, 8:43622 (RA;US)
Gilman, R., *See* Greene, S.J., 8:44980
Gimpel, R.W., *See* Friedlander, E.M., 8:44982
Gindler, J.E., Mass distributions in monoenergetic-neutron-induced fission of ^{239}Pu, 8:45024 (J;US)
See Ahmad, I., 8:45025
Ginn, L.L., *See* Clements, L.D., 8:43430
Gislason, K.B., Trajectory model with varying mixing height, 8:44680 (R;DK;In Danish)
Gittus, J.H., PWR degraded core analysis, 8:43929 (R;GB)
Gladitz, J., Sample size optimization in nuclear material control. 1. Random sampling for the variables test, 8:43411 (R;DD;In German)
Sample size optimization in nuclear material control. 2. Random sampling for the attribute test, 8:43412 (R;DD;In German)
Glagolev, V.V., Program controlled system for mathematical processing the αp-experiment data, 8:44603 (R;SU;In Russian)
Program selection of physical hypothesis in the film information processing system, 8:44599 (R;SU;In Russian)
Purpose and the principle of the organization of the automatic system for film information processing (ASMOFI), 8:44600 (R;SU;In Russian)
Glaser, H., Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8:43189 (R;DE;In German)
Glashauser, C., *See* Baker, F.T., 8:45009
Glass, G., *See* Denes, P., 8:44986
Glass, G.A., *See* Breinig, M., 8:44901
Glatz, J.P., Cationic ruthenium-nitrosyl complexes in radioactive waste solutions, 8:44331 (B;DE;In German)
Glazov, A.A., Experiments on the orbit expansion effect, 8:44494 (R;SU;In Russian)
Glebov, A.P., Technique and computer code for calculating the isotope composition change in one-dimensional homogeneous reactor, 8:43839 (R;SU;In Russian)
Glendenin, L.E., *See* Gindler, J.E., 8:45024
Glendenning, N.K., *See* Matsui, T., 8:44932
Glushkov, E.S., Technique and the DAR and FINDIF codes for one-dimensional calculation of reactor cells with opportunity of account for discontinuous boundary conditions, 8:43841 (R;SU;In Russian)
Godlove, T.F., U.S. experimental program in inertial fusion, 8:44528 (RA;DE)
Goedbloed, J.P., Comparison of two approaches for solving equilibrium problems for axisymmetric current-carrying plasmas, 8:45153 (R;NL)
Goekmen, A., *See* Kwiatkowski, K., 8:44989
Goel, B., Neutron fuel interaction in a HIBALL target, 8:45042 (RA;DE)
Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis, 8:43849 (R;DE)
Goethals, R., Energy from the wind, 8:43670 (TJ;GB)
Goethel, G.F., Coal liquefaction and heavy oil conversion minimizing of environmental impact results from Veba Oel prefeasibility study, 8:43236 (RA;US)
Gol'tsev, A.O., Preparation of the constant library in the NEKTAR-M program using the files of evaluated neutron data, 8:43790 (R;SU;In Russian)
Golant, V.E., *See* Baranov, Yu.F., 8:45115
See Bulyginskij, D.G., 8:45116
Goldbach, G., *See* Guillory, J., 8:43212
Goldberg, M., *See* Miller, J.E., 8:43465
Golden, D.M., Water pollution arising from solid waste (coal, fly ash, slag) disposal, and measures to prevent water pollution, 8:44739 (RA;DK)
Goldenbaum, G.C., *See* Bruhns, H., 8:45184
See Turner, W.C., 8:45168
Goldhar, J., *See* Taylor, M.W., 8:44404
Goldman, A.S., *See* Stirpe, D., 8:43410
Goldsmith, W.A., *See* Ryan, M.T., 8:44706
Goldstein, N.E., *See* Wilt, M.J., 8:43656
Goldstein, R.F., Vibronically coupled two-level systems: Radiationless transitions in the slow regime, 8:45068 (J;US)
Goldston, R.J., *See* Brau, K., 8:45151
Golenetskij, S.P., Application of the arsenide-gallium detectors in X-ray radiometric analysis, 8:44613 (RA;SU;In Russian)
Golomb, M., *See* Krischke, H., 8:43257
Golosaj, N.I., Device for information input into a computer, 8:45291 (R;SU;In Russian)
Golovach, L.A., Graph plotter software connected with computer M-6000 (Basic programs), 8:45302 (R;SU;In Russian)
Storage and processing of one-dimensional spectra using the hierarchy computer system, 8:45301 (R;SU;In Russian)
Golovanov, L.B., Vessel for cryogenic liquid with a flexible vacuum shell, 8:44387 (R;SU;In Russian)
Golovanov, V.V., *See* Adamovskij, L.A., 8:43812
Golovatyuk, V.M., *See* Vojtkovska, I., 8:44607
Golub, R., *See* Heckel, B., 8:45053
Golubev, N.A., Specific features of dislocation loop formation under a pulsed high-current beam irradiation, 8:44160 (RA;SU;In Russian)
Goman, V.S., *See* Glagolev, V.V., 8:44599
Goncharov, S.G., *See* Bulyginskij, D.G., 8:45116
Gong, C.S., *See* Chen, L.F., 8:43517
See McCracken, L.D., 8:43459
Gonnord, J., *See* Baur, A., 8:43758
Gonzalez Garcia, V., *See* Rodrigo Otero, A., 8:43327, 8:43328
Goodman, F.R. Jr., Wind power: a promising future generating option, 8:43707 (RA;US)
Gordon, H.A., *See* Baggett, N., 8:44561
Gordon, H.T., Selected strategies and results from Commercial Buildings Design and Demonstration Program (PON), 8:43593 (RA;US)
Gordon, R.S., *See* Harlow, R.A., 8:43977
Gorelikinskij, Yu.V., *See* Grishchenko, V.F., 8:44270
Gorichev, P.A., Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber, 8:44578 (R;SU;In Russian)
Gornov, M.G., Definition of the structure layers of semiconductor detectors by means of charged particles, 8:44594 (R;SU;In Russian)
Surface-barrier detectors made of silicon doped by phosphorus in thermal neutron flux, 8:44589 (R;SU;In Russian)
See Gajsak, I.I., 8:44588
Gorski, A.J., Long-term ice storage for cooling applications using passive freezing techniques, 8:43613 (RA;US)
Gorton, C.W., *See* Knight, J.A., 8:43435
Goryunov, V.K., EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms, 8:43766 (R;SU;In Russian)
Gosch, R., Influence of hydrogen on pure iron and steel at medium and high pressure levels, 8:44174 (R;DE;In German)
Gosling, J.T., *See* Feldman, W.C., 8:44834
Gotaas, Y, Effect of future centralized heating in Oslo on air quality. Pt. 1, 8:44708 (R;NO;In Norwegian)
Goto, N., *See* Tanabe, H., 8:45197
Gottlieb, S., *See* Bitar, K.M., 8:44963
Goubau, W.M., *See* Koch, R.H., 8:44398
Gould, A.V., *See* Bernstein, A.J., 8:43663
See Entingh, D.J., 8:43653
Gould, H., *See* Crawford, H., 8:44880
Gove, N., Survey of AEC and NASA capabilities in computerized data management, 8:44001 (RA;US)
Govorun, N.N., Parameter choice of a special microprocessor, 8:44583 (R;SU;In Russian)
Software structure of computer graphics for on-line physical

experiments, 8:45297 (R;SU;In Russian)
See Baginyan, S.A., 8:44605
See Glagolev, V.V., 8:44599, 8:44600, 8:44603
Gowdy, G.M., *See* Casten, R.F., 8:45022
Graca, M.C., Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle, 8:44422 (R;BR;In Portuguese)
Grady, D.E., Nonhydrostatic effects in stress-wave induced phase transformation of calcite, 8:44284 (R;US)
See Trucano, T.G., 8:44195
Gram, F., *See* Henriksen, J.F., 8:44173
Gram, P.A.M., *See* Jones, S.E., 8:45215
Grambo-Rasmussen, A., Brown-coal reserves of Denmark. Report of phase 1, 8:43245 (R;DK;In Danish)
Grandjean, N.R., *See* Treadwell, G.W., 8:43648
Granneman, E.H.A., *See* Turner, W.C., 8:45168
Grant, A.T., Willow Park II Community Center, 8:43611 (RA;US)
Grant, P.M., Generator production of ^{172}Lu from ^{172}Hf for limited nuclear medicine research, 8:44366 (J;CH)
Grant, W.F., Chromosome aberration assays in Allium, 8:44810 (J;NL)
Granziera, M.R., Two-dimensional model for transients calculations with phase changes in sodium cooled reactors, 8:43920 (RA;BR;In Portuguese)
Grashin, A.F., *See* Bogomolova, E.S., 8:44364
Grau, A., Calculation of the detection efficiency in liquid scintillators. II. Single positron emitters, 8:44579 (R;ES;In Spanish)
Calculation of the detection efficiency in liquid scintillators. III. Single electron-capture radionuclides, 8:44580 (R;ES;In Spanish)
Grauman, F., Shelly Ridge Program Center building, 8:43598 (RA;US)
Gray, K.E., Ginzburg-Landau equations, interphase surface energy, and the intermediate state of superconductors with a paramagnetic normal state, 8:45079 (J;US)
Type-II to type-I transition in superconducting, sputtered $ErRh_4B_4$ films, 8:44250 (J;US)
Gray, R.W., Memphis industrial fuel gas demonstration plant, 8:43181 (RA;US)
Grebogi, C., Fractal basin boundaries, long-lived chaotic transients, and unstable-unstable pair bifurcation, 8:45094 (J;US)
Harmonic generation of radiation in a steep density profile, 8:45166 (J;US)
Green, D.A., Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8:43217 (R;US)
Green, K., *See* Heckel, B., 8:45053
Greenbaum, E., Application of intact algae to the biophotolysis, 8:43419 (J;US)
Greenberg, S., Microprocessor-based power control data acquisition system, 8:43872 (R;IL;In Hebrew)
Greene, G.L., *See* Heckel, B., 8:45053
Greene, J.L., *See* Congdon, J.D., 8:44785
Greene, S.J., Diffractive angular distribution for $^{16}O(\pi^+, \pi^-)^{16}Ne$(g.s.), 8:44980 (J;US)
See Burleson, G.R., 8:44927
Greenfield, S.M., Overview of research in the Environmental Protection Agency, 8:43992 (RA;US)
Greensite, J., *See* Sterling, T., 8:44962
Greenwood, R.C., Identification of a new isotope ^{165}Tb, 8:45014 (J;US)
Greff, E., Concentration of wind power in turbulent fields and their utilization for the production of energy, 8:43700 (RA;DE;In German)
Gregor, M., *See* Sulc, V., 8:43814, 8:43815
Gregory, D.C., Measurement of the cross section for electron-impact ionization of Xe^{6+} ions, 8:44891 (J;US)
Greiner, D., *See* Crawford, H., 8:44880
Grennfelt, P., *See* Schjoldager, J., 8:44681
Gresho, P.M., *See* Knox, J.B., 8:44691
Gribanov, Yu.A., *See* Volkov, Yu.F., 8:45237
Griem, H.R., *See* Bruhns, H., 8:45184
Grier, C., *See* Wethington, J.A., 8:43394
Griesbaum, K., Fuels of the future, 8:43424 (RA;DE;In German)
See Hedden, K., 8:44013
Griffin, D.C., *See* Pindzola, M.S., 8:44890
Griffith, R.V., *See* McDonald, J.C., 8:45059
Grigalashvili, T.S., *See* Aleev, A.N., 8:44585
Grigull, R., *See* Berger, C., 8:44915
Grillot, M., Oil market Simulation model documentation report, 8:44038 (R;US)
Grimm, M.A., *See* Baker, F.T., 8:45009
Grimm-Strele, J., Measurement of jet propagation in the intermediate near-field of a coolant water outlet, 8:44751 (R;DE;In German)
Grimont, B., Development of a system for the measurement of contamination by plutonium: captor and RC signal post for plutonium and other transuranium elements aerosols, 8:44562 (R;FR;In French)
Grimsditch, M., *See* Khan, M.R., 8:44204
See Polian, A., 8:44301
Grinstein, G., Exact solution of a one-dimensional Ising model in a random magnetic field, 8:45077 (J;US)
Grishchenko, V.F., Distribution of paramagnetic centers and implanted atoms produced in Si by ^{235}U fission fragments, 8:44270 (RA;SU;In Russian)
Grob, A., Spatial distributions of energy deposited by heavy ions into nuclear collisions, 8:44269 (RA;SU)
Grob, J.J., *See* Grob, A., 8:44269
Grodzinskij, E.V., *See* Artemenkov, L.I., 8:45224
Gronsky, R., *See* Mazur, J.H., 8:44283
Groos, E., *See* Fukuda, K., 8:43848
Grossin, R., *See* Thellier, F., 8:44080
Grossman, G., *See* Fruchter, E., 8:43649
Grotzschel, R., Laser annealing of disordered regions in silicon, 8:44274 (RA;SU)
Groves, C.R., Ecological characteristics of small mammals on a radioactive waste disposal area in southeastern Idaho, 8:43397 (J;US)
Grubb, D.P., Energy confinement studies in the tandem mirror experiment (TMX): Power flow, 8:45169 (J;US)
Energy confinement studies in the tandem mirror experiment (TMX): Power balance, 8:45170 (J;US)
Gruebl, G.J., Meson theory of low-energy elastic nucleon-antinucleon scattering, 8:44929 (R;AT;In German)
Gruen, D.M., *See* Pellin, M.J., 8:45198
Gryzinski, M., Fusion at counterstreaming ion beams - ion optic fusion (IOF), 8:45244 (RA;CS)
Guanehr, M., *See* Binon, F., 8:44571
Gudkov, A.V., *See* Bokov, M.A., 8:44556
Guenther, D.E., *See* Andrews, L.J., 8:43646
Guenthner, R., Energy plant process operations Curriculum-Development Project. Final technical report, 8:43283 (R;US)
Guillory, J., Granular-bed-filter development program, Phase II. Final report, 8:43212 (R;US)
See Tripathi, V.K., 8:44887
Gumenyuk, S.A., Analysis of the data recorded from the intermediate gamma detector of the European hybrid spectrometer on the base of the statistical model of an electromagnetic shower, 8:44572 (R;SU;In Russian)
Gummesson, S., *See* Percival, W.H., 8:43473
Gunther, K., *See* Varelas, C., 8:44143
Gurov, A.A., *See* Artemenkov, L.I., 8:45224
Gurov, Yu.B., *See* Gajsak, I.I., 8:44588
See Gornov, M.G., 8:44589, 8:44594
Gusev, K.I., Sputtering of titanium and its alloys by 1 to 6 keV He ions, 8:44845 (RA;SU;In Russian)
Gusev, V.K., *See* Bulyginskij, D.G., 8:45116
Gusev, V.M., Radiation blistering of Nb implanted with helium ions of energies expected in the fusion reactor, 8:44150 (RA;SU;In Russian)
Guseva, M.I., *See* Gusev, V.M., 8:44150
Gutbrod, H.H., *See* Warwick, A.I., 8:44931, 8:45020
Guthrie, D.H., Two zicronium iodide clusters. Hexazirconium dodecaiodide (Zr_6I_{12}) and cesium hexazirconium tetradecaiodide ($CsZr_6I_{14}$), 8:44343 (J;US)
Gutmacher, R.G., *See* Stirpe, D., 8:43410
Guvanasen, V., *See* Chan, T., 8:43361
Guzik, Z., *See* Vojtkovska, I., 8:44607

H

Haaf, W., *See* Mayr, G., 8:43701
Haagenrud, S.E., *See* Henriksen, J.F., 8:44173
Haas, P.M., *See* Knee, H.E., 8:43956
Haas, Philippe, Experimental measurement of the photon efficiency of a 4 mm thick NE 102 A scintillator for 14 MeV neutrons, 8:44566 (R;FR;In French)
Habegger, L., Environmental implications of solar and biomass energy growth, 8:44049 (R;US)
Haber, I., Simulation of the longitudinal dynamics of a cold bunched beam, 8:44492 (RA;DE)
Hadden, C.T., *See* Billen, D., 8:44788
Hadermann, J., Data base for a site-specific analysis of the dispersion of

radioactive elements from a final repository, 8:43399 (TG;US)
Haenninen, H., *See* Toerroenen, K., 8:44180
Haeuser, U., Investigations on operational behaviour of hybrid cooling towers, 8:43731 (R;DE;In German)
Hafizi, B., Quasilinear theory of suprathermal ions in mirror machines in the presence of radio-frequency fluctuations, 8:45160 (J;US)
Hahn-Haegerdal, B., Shift in metabolism towards ethanol production in Saccharomyces cerevisiae by addition of metabolic inhibitors, 8:43466 (J;US)
Shift in metabolism towards ethanol production in Saccharomyces cerevisiae using alterations of the physical-chemical microenvironment, 8:43467 (J;US)
See Mitchell, R.W., 8:44783
Haidt, D., *See* Bartel, W., 8:44916
Haire, R.G., *See* Hobart, D.E., 8:44365
Hale, D.A., Crack growth resistance of low alloy steel in high temperature oxygenated water, 8:43782 (RA;US)
See Horn, R.M., 8:44175
Halfmann, K.D., *See* Junior, P., 8:44488
See Klein, H., 8:44522
Hall, L.J., *See* Gaillard, M.K., 8:44957
Hall, R.M. Jr., *See* Crase, K.W., 8:44789
Halzen, F., Production of heavy quarks: A nonperturbative approach, 8:44945 (J;US)
Hama, S., *See* Clark, B.C., 8:44996
Hamaker, H.C., Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8:44246 (J;US)
See Majkrzak, C.F., 8:44253
See Shelton, R.N., 8:44245
See Yang, K.N., 8:44242
Hamard, J., *See* Le Grand, J., 8:43880
Hamilton, L.B., Overview of DOE national performance evaluation program, 8:43579 (RA;US)
Hammer, J.H., *See* Turner, W.C., 8:45168
Hammerle, J.R., National Air Data Branch: NEDS/SAROAD, 8:44709 (RA;US)
Hammershaimb, E., *See* Kuuskraa, V., 8:43295
Hammond, J., Cool pool: a passive cooling system, 8:43614 (RA;US)
Hampson, D.C., Geography - outline of deposits, where they are, how much they contain, 8:43311 (R;AU)
Hamrick, J.T., Development of wood as an alternative fuel for gas turbine systems, 8:43472 (RA;US)
Han, Y.W., Effect of γ-ray irradiation on sugar production from plant biomass, 8:43519 (J;US)
Hann, G., *See* Alejnikov, V.E., 8:44597
Hanson, D.A., Economics of extracting blanket tight-sands gas with current and improved technology, 8:43293 (R;US)
See Bhandari, J.S., 8:43987
Hansson, B., *See* Percival, W.H., 8:43473
Hansson, T.H., *See* Carlson, C.E., 8:44943
Harada, Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8:44186 (RA;US)
Harada, J., *See* Stevenson, A.W., 8:44646
Harbrink, B., *See* Jaeschke, M., 8:43301
Harding, D.G., *See* Hoffman, A.L., 8:45185
Harding, W., General approach to assure compliance with ALARA guidelines on direct radiation from a nuclear power plant, January 1979-January 1982, 8:43936 (R;US)
Harlow, R.A., Status of the Ford sodium-sulfur battery program, 8:43977 (RA;US)
Harmon, D., Logistics of Australian uranium in the world market, 8:43332 (R;DE)
Harper, S., *See* Croes, W.H., 8:43446
Harris, *See* Stroeble, H., 8:45023
Harris, C.B., *See* Whitmore, P.M., 8:44306
Harris, S.E., Laser techniques for extreme-ultraviolet spectroscopy, 8:44631 (R;US)
Harrison, F.L., Concentration and distribution of copper in effluents from the H.B. Robinson Steam Electric Plant, 8:43877 (R;US)
Harrison, J.W., Photovoltaic cell and module status, 8:43498 (RA;US)
Hart, G.W., *See* Bruhns, H., 8:45184
Hartkopf, V., Passive solar retrofit of all-glass office buildings, 8:43595 (RA;US)
Hartlen, J., Disposal of waste material. Evaluation in the KHM project of short and long-term effects, 8:43195 (RA;DK)
Hartman, C.W., *See* Turner, W.C., 8:45168
Hash, G.L., *See* Ochoa, A. Jr., 8:44627
Hasrullaev, D.M., *See* Askerov, Sh.G., 8:44851
Haste, T.J., *See* Bowring, R.W., 8:43897
Hastings, D.E., Nonresonant electron transport in the ELMO Bumpy Torus experiment using a BGK operator, 8:45180 (J;US)
Resonant ion transport in the ELMO Bumpy Torus, 8:45176 (J;US)
See Tolliver, J.S., 8:45173
Hatch, S.W., Evaluation of severe accident safety system value based on averting financial risks, 8:43950 (R;US)
Hatori, T., Nonlinear theory of drift instability, 8:45139 (RA;JP)
Hattori, T., *See* Nakanishi, T., 8:44470
Hauser, S.G., Investigation of combined heat and mass transfer from a wet heat exchanger. Part 2. Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8:44432 (R;US)
See Kreid, D.K., 8:44431
Haustein, P.E., *See* Clark, J.L., 8:45021
See Wouters, J.M., 8:45006
Haves, P., *See* Doderer, E., 8:43618
Hay, H.R., Skytherm natural thermal control design, production, and commercialization, 8:43617 (RA;US)
Hayes, D.B., *See* Eichelberger, J.C., 8:44816
Hayes, T.L., *See* Hillman, M., 8:43451
Haywood, F.F., *See* Ryan, M.T., 8:44706
Hazeltine, R.D., *See* Catto, P.J., 8:45162
Hazi, A.U., Theoretical study of the lowest $^1\Sigma$/sub g/$^+$ doubly excited state of H_2, 8:44897 (J;US)
Headley, T.J., *See* Dosch, R.G., 8:43384
Healey, T., *See* Gibson, I.H., 8:43896
Heap, M.P., *See* Chen, S.L., 8:43264
Heasler, H.P., *See* Hinckley, B.S., 8:43654
Heckel, B., Measurement of parity non-conserving neutron spin rotation in lead and tin, 8:45053 (J;NL)
Heckman, H.H., *See* Friedlander, E.M., 8:44982
Hedden, K., Institute in the year of 1981, 8:44013 (R;DE;In German)
Hedrick, C.L., *See* Hastings, D.E., 8:45176
See Tolliver, J.S., 8:45173
Heek, K.H. van, *See* Juentgen, H., 8:43240
Heep, D., *See* Deggim, D., 8:43147
Heesch, E.J.M. van, *See* Bogert, A.J. van den, 8:45154
Heffner, R.H., *See* Brown, J.A., 8:44307
Hehl, K., *See* Gartner, K., 8:44843
Heifetz, D., Monte Carlo calculation of neutral transport in Tokamaks, 8:45196 (J;US)
Heikhaus, H., Main characteristics of housing permitting reduced energy consumption for heating. Final report, 8:44079 (R;XE)
Heinisch, H.L., Computer simulation of displacement cascades in copper, 8:44139 (R;US)
Heinrichs, K., Dosimetry of internal emitters, 8:44802 (J;DE;In English and German)
Heintze, J., *See* Elsen, E., 8:44917, 8:44918
Heinzelmann, G., *See* Elsen, E., 8:44917, 8:44918
Heising, C.D., Generic nuclear safety issues: methods and examples, 8:43999 (BA;US)
Hellenbrand, K.H., *See* Elsen, E., 8:44917, 8:44918
Heller, L., *See* Mulders, P.J., 8:44936
Hellwege, H.E., *See* Hobart, D.E., 8:44365
Helmer, R.G., Levels in $_{84}^{204}$Po from the decay of $_{85}^{204}$At, 8:45016 (J;US)
Helms, L., *See* Simhan, K., 8:43688
Hemmen, M., Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District, 8:43192 (R;DE;In German)
Hemmers, R., Briefing package: Solar energy for hot water preparation and space heating. Pt. 2, 8:43643 (R;DE;In German)
Solar energy for hot water preparation and space heating. Pt. 1, 8:43642 (R;DE;In German)
Henderson, D., HIBALL target and reactor neutronic and photonic calculations, 8:44533 (RA;DE)
See Goel, B., 8:45042
Henderson, D.J., *See* Gindler, J.E., 8:45024
Henke, L., Representation of regions suitable for the construction of large wind power plants in the Federal Republic of Germany, 8:43683 (RA;DE;In German)
Henning, W., *See* Ernst, H., 8:45010
Henriksen, J.F., Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content, 8:44173 (R;NO)
Henry, E.A., *See* Hicks, H.G., 8:45003
Henry, J.F., *See* Bustany, P., 8:44761
Henry, M.P., *See* Chynoweth, D.P., 8:43447
Henryson, H. II, *See* Adams, C.H., 8:43797
Herczeg, P., Muon polarization in K/sub L/$\rightarrow\mu^+\mu^-$, 8:44941 (J;US)
Herlan, A., Criticism on the mass spectra of some polycyclic aromatic compounds detected in automobile

exhaust gas, 8:44684 (RA;DE;In German)
Herman, A.I., *See* Detroy, R.W., 8:43458
Hermansson, O., Ventilation in connection with vacuum impregnation. The construction of an impregnation plant with a good working environment and energy saving for the impregnation of wood, 8:44689 (R;SE;In Swedish)
Herrstroem, N.-Y., Correlations between projectile and target break-up in intermediate and high energy heavy ion collisions, 8:44976 (R;SE)
Herschbach, D.R., *See* Raynor, S., 8:44341
Herschitz, R., Atomic-resolution study of homogeneous radiation-induced precipitation in a neutron-irradiated W-10 at. % Re alloy. MSC report No. 5014, 8:44129 (R;US)
Herscovici, C., *See* Baker, B., 8:44055
Hershcovitch, A., *See* Alessi, J.G., 8:44511
Hershkowitz, N., *See* Chan, C., 8:45183
Herz, H., *See* Jochem, E., 8:44025
Hess, R.A., *See* Bruhns, H., 8:45184
Heuer, R.D., *See* Elsen, E., 8:44917, 8:44918
Hewing, G., *See* Juentgen, H., 8:43240
Heymann, P., *See* Prinzler, H., 8:45128
Hibbel, J., *See* Duerrfeld, R., 8:43151
Hickey, J., *See* Jones, G.E. Jr., 8:43177
Hicks, H.G., Population of ^{133}I from the beta decay of fission product ^{133}Te/ sup g/ and the cluster-vibration model, 8:45003 (J;US)
Hieber, L., Alpha radiation-induced alterations of the proliferation kinetics, chromatin structure and gene expression in mammalian cells, 8:44798 (R;DE;In German)
Hiersche, E.U., *See* Angerer, F., 8:44754
Higgins, L.J., *See* Turner, A.P.F., 8:44059
Higinbotham, W.A., Safeguards instrumentation: past, present, future, 8:43414 (J;US)
Hill, A.E., *See* Fischer, G., 8:44872
Hill, D., Evaluating new US energy technologies, 8:44015 (J;US)
See Burleson, G.R., 8:44927
Hill, F.E., Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report, 8:43248 (R;US)
Hill, H.A.O., *See* Turner, A.P.F., 8:44059
Hill, L.G., *See* Santini, D.J., 8:44652
Hill, R.W., Centralia partial-seam CRIP test, 8:43186 (R;US)
Hillesland, T. Jr., Wind power activities of Pacific Gas and Electric Company, 8:43711 (RA;US)
Hillman, M., Thermochemical conversion of biomass to ethanol. Final report, 8:43451 (R;US)
Hilmy, N., Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982, 8:44791 (R;XA)
Hinckley, B.S., Thermopolis hydrothermal system, with an analysis of Hot Springs State Park. Preliminary report No. 20, 8:43654 (R;US)
Hindi, M., *See* Kuhlmann, E., 8:44992
Hines, J., *See* Ahmad, I., 8:45025
Hinks, A.D.G., *See* Behroozi, F., 8:44247
Hinks, D., *See* Gray, K.E., 8:44250
Hintz, M.B., Goniometer attachment for low-speed diamond wafering saws, 8:44395 (J;US)
Hintze, W., Numerical simulation of collective ion acceleration, 8:44475 (RA;CS)
Hira, A.U., *See* Mulloney, J.A., 8:43455
Hirao, Y., Present status of heavy-ion fusion study in Japan, 8:44966 (RA;DE)
See Katayama, T., 8:44559
See Nakanishi, T., 8:44470
Hirshman, S.P., *See* Rome, J.A., 8:45195
Hjelmar, O., Marine disposal of fly ash from coal fired power plants, 8:43198 (RA;DK)
Marine disposal of fly ash from coal fired power plants, 8:43210 (RA;DK)
Hlava, P.F., *See* Dosch, R.G., 8:43384
Hobart, D.E., Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8:44365 (J;NL)
Hobbins, R.R., *See* Appelhans, A.D., 8:43903
Hochrainer, D., *See* Seehars, D., 8:44704
Hocke, K.D., Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8:43911 (R;DE;In German)
Hodge, M.H., Heat Mirror transparent insulation, 8:43633 (RA;US)
Hodgkinson, D., Analytical models for thermal rock mechanics, 8:43392 (B;GB)
Hodson, J.S., *See* Allen, R.E., 8:43828
Hodson, S.W., *See* Starrfield, S.G., 8:44828
Hodul, D.T., Photoacoustic and absorption spectra of UF_4, 8:44312 (J;US)
Hodulak, L., *See* Blauel, J.G., 8:44192
Hoeg, H.I., Occurrence of fungus spores in chip combustion and storage installations. II., 8:43504 (R;NO;In Norwegian, English)
Hoehn, M.V., *See* Laubacher, D.B., 8:45012
Hoenes, G.R., Comparison of occupational dose estimates for TMI-2 recovery operation, 8:43787 (R;US)
Hoenicke, D., *See* Griesbaum, K., 8:43424
Hoetzel, C., *See* Hemmers, R., 8:43642, 8:43643
Hoffer, P.B., Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8:44767 (R;US)
Hoffman, A.L., Suppression of the n = 2 rotational instability in field-reversed configurations, 8:45185 (J;US)
Hoffman, E.W., *See* Burleson, G.R., 8:44927
Hoffmann, G.W., *See* Baker, F.T., 8:45009
Hoffmann, H., *See* Marten, K., 8:43808
Hoffmann, K., *See* Gladitz, J., 8:43411, 8:43412
Hofler, T., *See* Wheatley, J., 8:44436
Hofman, K.H., Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8:44368 (R;DE;In German)
Hofmann, B., *See* Dymke, N., 8:45309
Hofmann, H., Fission dynamics simplified, 8:45036 (J;NL)
Hofmann, I., Multi-dimensional computer simulation of intense beams, 8:44484 (RA;DE)
Space charge problems in final beam transport, bunching and focusing, 8:44491 (RA;DE)
Hofmann, J.R., *See* Gelbard, E.M., 8:45278
Hofmann, W., Radiation burden in dwelling-houses by radon and its daughter elements, 8:44698 (RA;AT;In German)
Hogan, J.T., Model for pneumatic pellet injection, 8:45257 (R;US)
Hogan, S., Simplified contacting scheme for GaAs solar cells using silver, 8:43509 (R;US)
Hojvat, C., Calculation of antoproton yields for the Fermilab Antiproton Source, 8:44555 (J;NL)
Holian, B.L., Melting of pseudopotential sodium from molecular dynamics, 8:44311 (J;US)
See Shaw, M.S., 8:44303
Hollaender, W., Emission and ambient concentrations of longliving aerosol radionuclides at stade nuclear power plant, 8:44705 (RA;DE)
Holland, R.F., *See* Maier, W.B., 8:44313
Hollebeek, R.J., *See* Loehr, B., 8:44928
Hollowell, C.D., Monitoring equipment. I. Survey of air monitoring instrumentation, 8:44660 (RA;US)
Holman, M., Measured spectra of neutrons escaping from iron spheres, 8:43852 (R;CS)
Holmes, J.C., *See* Kolb, C.R., 8:43371, 8:43372
Holmes, N.C., *See* Gathers, G.R., 8:44201
Holmes, R.F., *See* Koutsandreas, J.D., 8:44000
Holmgren, D.E., *See* Harris, S.E., 8:44631
Holmqvist, B., *See* Olsson, N., 8:45015
Holt, N.A., Overview of gasification technology, 8:43179 (RA;US)
Holtkamp, D.B., *See* Greene, S.J., 8:44980
Holton, L.K., *See* Wheelwright, E.J., 8:43391
Holy, K., Some characteristics of a multiwire corona counter, 8:44574 (RA;CS;In Slovak)
Holzdeppe, D., *See* Greff, E., 8:43700
Hommert, P.J., Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8:43305 (R;US)
Hong, B., *See* Horton, W., 8:45174
Hoock, S., Wind-energy systems for electric utilities: a synthesis of value studies, 8:43678 (R;US)
Hooke, W., *See* Jobes, F., 8:45148
See Stevens, J., 8:45152
Hooper, R.L., *See* Morris, F.A., 8:43940
Hopkins, M., Performance analysis of a solar attached greenhouse near Three-Mile Island using fuel bill data, 8:43584 (RA;US)
Hopp, G., *See* D'Agostini, G., 8:44919
Hoppe, M.M., *See* Feldman, W.C., 8:44834
Horak, D.V., Fe^* emission yield and photoionization of $Fe(CO)_5$ by vacuum-ultraviolet radiation, 8:44357 (J;US)
Horan, J.T., *See* Cox, T.E., 8:43910
Horikoshi, G., Proceedings of the 3rd meeting on ultra high vacuum

techniques for accelerators and storage rings, Tsukuba, January 24-25, 1980, 8:44448 (R;JP;JA)
Horn, R.M., Crack growth behavior of sensitized stainless steel in high temperature, high purity oxygenated water, 8:44175 (RA;US)
Horng, H.E., *See* Shelton, R.N., 8:44245
Horst, J.W., *See* Doran, J.C., 8:44657
Horton, W., Electromagnetic drift modes driven by pressure gradients in tokamaks, 8:45174 (J;US)
Hosang, H., *See* Goethel, G.F., 8:43236
See Langhoff, J., 8:43155
Hosea, J., *See* Jobes, F., 8:45148
Hoshi, E.V., *See* Esch, E.L., 8:43745
Hosteny, R.P., *See* Adams, C.H., 8:43797
Hou, M., Computer simulation of the grazing incidence backscattering of protons from a (110) nickel surface, 8:44860 (RA;SU)
Houghton, W.J., *See* Bender, D.M., 8:43909
House, P., Mission and work programs of the Environmental Studies Division of EPA, 8:43995 (RA;US)
Hovis, V.M., *See* Bell, R.T., 8:44209
Howe, L.M., *See* Swanson, M.L., 8:44147
Howe, R.E., CAMDAS (CAMAC data-acquisition system), 8:45315 (R;US)
Howell, R.H., Positron annihilation studies of molybdenum irradiated by protons, neutrons or electrons, 8:44227 (BA;NL)
Structural changes observed in (Mosub(.6)Rusub(.4))sub(x)Bsub(1-x) amorphous alloys observed with positron annihilation, 8:44231 (BA;NL)
Howells, G.D., Fishery status and water quality in areas affected by acid deposition, 8:44734 (RA;DK)
Hoy, H.C., Potentially damaging failure modes of high- and medium-voltage electrical equipment, 8:44452 (R;US)
Hruska, J., *See* Kravarik, J., 8:45125
Hsu, F.H., Positron annihilation studies of phase transitions in ferromagnetic and antiferromagnetic crystals, 8:44233 (BA;NL)
Hsu, K.J., *See* Donnelly, J.R., 8:43197
Hsueh, K.L., *See* Srinivasan, S., 8:44054
Huang, C.S., *See* Li, K., 8:43163
Hub, K.A., *See* Miliaras, E.S., 8:43725
Hubbard, D.A., *See* Smith, M.R., 8:43157
Huber, W., Emissions from coal utilization facilities and possible abatement measures, 8:43239 (R;DE;In German)
Grain boundary phenomena in n-type CdTe films grown by hot wall vacuum evaporation, 8:44289 (J;US)
Hubner, K., Investigation of possibility for using color threshold detectors in the determination of accelerated ion fluence, 8:44598 (R;SU;In Russian)
Hudis, J., *See* Clark, J.L., 8:45021
Huebler, J.E., Acoustic technique for pinpointing leaks in low-pressure gas mains, 8:43297 (R;US)
Huffman, W.J., *See* Hillman, M., 8:43451
Hui, M.M., *See* Davis, C.R., 8:43833
Huitron, C., *See* Blancas, A., 8:43521
Hultberg, H. Grennfelt, P., Sulphur and chloride deposition and ecosystem transport in a strongly acidified lake watershed, 8:44735 (RA;DK)
Humanic, T.J., *See* Ernst, H., 8:45010
Humphrey, J.P., Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977, 8:43304 (R;US)
Hunn, B.D., Applications of DOE-2 for the analysis of passive solar buildings, 8:43571 (RA;US)
Hunt, A.J., Holographic window coatings for solar control and daylighting: assessment report, 8:44082 (R;US)
Hurrle, A., Mass spectrometric analysis of silicon for solar cells, 8:44323 (R;DE;In German)
Husinsky, W., Velocity measurements of neutral sputtered particles by means of a Doppler shift laser spectrometer, 8:44847 (RA;SU)
Hussin, A., *See* Scheibel, H.G., 8:44676
Hustrulid, W.A., *See* Doe, T.W., 8:43363
Hutchins, B.A., *See* Davis, C.R., 8:43833
Hutton, A., Evaluation of the beam-beam effect in PEP using Myer's simulation program, 8:44503 (R;US)
Hwang, H., Consensus estimation study of nuclear power plant structural loads, 8:43944 (R;US)
Hyde, J.C., *See* Wray, W.O., 8:43628
Hyde, P.J., *See* Srinivasan, S., 8:44054
Hyer, F.K., *See* Venhuizen, J.R., 8:43900

I

Ibragimov, Sh.Sh., Effect of helium on defect structure formation in molybdenum under alpha-particle irradiation, 8:44158 (RA;SU;In Russian)
Radiation hardening and creep of metals, 8:44163 (RA;SU;In Russian)
Role of inelastic processes in displaced atom production under irradiation of materials by neutrons and charged particles, 8:44273 (RA;SU;In Russian)
See Dekhtyar, I.Ya., 8:44165
Ibrahim, S.R., *See* Carne, T.G., 8:43721
Ichikawa, S., Method for treating solid substances in original water, 8:44746 (TG;US)
Iglehart, D.L., *See* Lim, E.Y., 8:43966
Igo, G., *See* Baker, F.T., 8:45009
Ikossi, P.G., *See* Snover, K.A., 8:44978
Imai, K., *See* Burleson, G.R., 8:44927
Imasaki, K., *See* Ozaki, T., 8:45110
Imry, Y., *See* Ben-Jacob, E., 8:44394
Inglis, D.J., Photovoltaic field test performance assessment, 8:43531 (RA;US)
Ingraham, J.C., Infrared calorimeter for time-resolved plasma energy flux measurement, 8:45186 (J;US)
Ingvald, K., *See* Doe, T.W., 8:43363
Inoue, M., *See* Daido, H., 8:45227
Inutake, M., *See* Tsushima, A., 8:45138
Invernizzi, M., Pattern recognition method for nuclear reactor core surveillance, 8:43759 (R;FR;In French)
Inyakin, A.V., Study on the characteristics of lead-glass γ-spectrometer radiators irradiated by high energy particles, 8:44625 (R;SU;In Russian)
Irby, J.H., *See* Bruhns, H., 8:45184
Irish, E.R., *See* Wheelwright, E.J., 8:43391
Isaev, A.G., Simple current-to-frequency converter, 8:44550 (R;SU;In Russian)
Isaev, A.S., *See* Zabolotin, V.P., 8:44495
Ishibe, Y., *See* Sakamoto, Y., 8:45251
Ishiguro, Y., Possible types of breeders with thorium cycle, 8:43805 (RA;BR;In Portuguese)
Ishmukhametov, M.Z., *See* Baluka, G., 8:44595
Isildar, M., Radiation-induced mutagenicity and lethality in Salmonella typhimurium, 8:44787 (R;US)
Ismail, K.A.R., Experimental analytical study on heat pipes, 8:44382 (R;BR;In Portuguese)
Israel, S., *See* El-Bassioni, A., 8:43958
Itoh, M., Aerosol measurement by photon correlation spectroscopy, 8:44674 (RA;DE)
Ivan'shin, Yu.I., *See* Vishnyakov, V.V., 8:44590
Ivanchenko, I.M., *See* Govorun, N.N., 8:45297
See Ivanchenko, Z.M., 8:45296
Ivanchenko, Z.M., Comparative characteristics of programs for statistical distribu-- tion collection in the HBOOK system, 8:45296 (R;SU;In Russian)
Ivanov, I.A., Energy losses when three-step current switching from an inductive storage into a coil with a liner, 8:45221 (R;SU;In Russian)
Ivanov, L.I., *See* Bondarenko, G.G., 8:44154, 8:44277
Ivanov, V.G., *See* Glagolev, V.V., 8:44599, 8:44600, 8:44603
Ivanova, L.M., *See* Bondarenko, G.G., 8:44277
Iwanzik, W., *See* Tevini, M., 8:44790

J

J.W., *See* Stroeble, H., 8:45023
Jaccarino, V., *See* Birgeneau, R.J., 8:44293
Jackson, D.P., Influence of stopping power on the reflection coefficients of hydrogen ions from stainless steel, 8:44861 (RA;SU)
Jackson, J.B., Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8:44040 (R;US)
Jackson, W.B., Energy dependence of the carrier mobility-lifetime product in hydrogenated amorphous silicon, 8:44302 (J;US)
See Andrews, W.B., 8:43333
Jacobi, A. Jr., Probabilistic approach in selecting the serviced area for public radiation alarm systems in the vicinity of nuclear power plants, 8:43963 (BA;US)
Jacobs, G.K., *See* Deju, R.A., 8:43378
Jacobs, S., Quarkonium bound states and coupling to hadrons, 8:44952 (J;US)
Jacobsen, L., *See* Falster, H., 8:43207
Jacobson, R.A., *See* Shelton, R.N., 8:44245
Jaeger, E.F., *See* Hastings, D.E., 8:45176
See Tolliver, J.S., 8:45173
Jaeschke, M., Correction of the AGA NX-19 mod data-processing system

for real gas factors of type H natural gas, 8:43301 (TJ;GB)
Jahn, W., *See* Ehrhardt, K.D., 8:43922
Jakobsson, B., Calendar of high multiplicity ^{12}C induced reactions in Ag (Br), 8:45000 (R;SE)
Jakubka, K., *See* Datlov, J., 8:45117, 8:45242
See Stoeckel, J., 8:45122
Jalenak, W.A., Infrared multiphoton dissociation of 1-chloro-1-fluoro ethylene: Competitive reactions and pressure dependence, 8:44885 (J;US)
Jamali, K.M.A., Probabilistic methods for identification of significant accident sequences in loop-type LMFBRs, 8:43941 (R;US)
James, D.R., *See* Christophorou, L.G., 8:44294
James, J.M., *See* Brown, D.J., 8:43339
James, R.B., Carrier multiplication in semiconductors induced by the absorption of high-intensity CO_2 laser light, 8:44298 (J;US)
Jameson, R.A., Space-charge and emittance blowup in linacs, 8:44481 (RA;DE)
Summary of the linac discussion group, 8:44473 (RA;DE)
Janca, J., Coating of laser fusion targets by plasma polymerized organic thin films, 8:43415 (RA;CS)
Jank, R., Large-scale thermal storage systems, 8:43971 (R;DE;In German)
Jansky, J., Crack initiation and crack growth at the inner nozzle corner surface under thermal shock loading, 8:44191 (RA;US)
Janssen, L.G.J., Normal and exceptional loads for wind turbines with horizontal axis, 8:43679 (RA;NL;DU)
Jape, A.D., *See* McGowan, T.F., 8:43431
Jarass, L., *See* Obermair, G.M., 8:43673
Jardin, S.C., *See* Park, W., 8:45163
Jardine, J.M., Transportation incidents involving Canadian shipments of radioactive material. 1947 - 1978, 8:44375 (R;CA)
Jared, R., *See* Sidman, S., 8:44620
Jarmer, J.J., *See* Burleson, G.R., 8:44927
Jarmie, N., *See* Gagliardi, C.A., 8:44987
Jarpe, J.S., Russian fireplace: demonstrations and workshops. Final report, January 1, 1980-January 31, 1981, 8:44084 (R;US)
Jaworski, N.A., Environmental modeling: ecosystems, 8:44723 (RA;US)
Jean, J.Y., *See* Schrader, D.M., 8:44317
Jean, Y.C., Search for the charge density wave in solids by positrons: a 2H-$TaSe_2$ crystal, 8:44321 (BA;NL)
Jeffrey, J.P., *See* Clements, L.D., 8:43430
Jeffries, T.W., Comparison of Candida tropicalis and Pachysolen tannophilus for conversion of xylose to ethanol, 8:43460 (J;US)
Jellison, G.E. Jr., Optical functions of silicon between 1.7 and 4.7 eV at elevated temperatures, 8:44292 (J;US)
Jenkins, D.M., *See* Hillman, M., 8:43451
Jenkins, R.G., *See* Walker, P.L. Jr., 8:43164
Jenkins, T.M., *See* Busick, D.D., 8:45060
Jennings, C.W., Insulation-resistance measurements of coated and uncoated printed wiring boards, 8:44453 (R;US)
Jensch, K., *See* Biasin, K., 8:44101
Jensen, B., Grounding guidelines: practical examples for power systems at LLNL, 8:44447 (R;US)
Refractive index of quaternary In/sub 1-x/Ga/sub x/As/sub y/P/sub 1-y/ lattice matched to InP, 8:44300 (J;US)
Jensen, R.T., Characteristics of transuranic waste at Department of Energy sites, 8:43377 (R;US)
Jerger, D.E., *See* Chynoweth, D.P., 8:43447
Jernigan, T.C., *See* Johnson, R.L., 8:45199
Jessel, W., Establishing a reaction model of the irradiated carbon tetrachloride/ water system, 8:44362 (B;DE;In German)
Jewett, C.W., *See* Horn, R.M., 8:44175
Jobes, F., Current-drive experiments on the PLT Tokamak, 8:45148 (R;US)
See Stevens, J., 8:45152
Jochem, E., Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors, 8:44025 (R;DE;In German)
Joensson, G., *See* Jakobsson, B., 8:45000
Johanson, W.R., *See* Wire, M.S., 8:44213
Johansson, B., Rockstore. A plant for seasonal storage of heat, 8:43975 (R;SE;In Swedish)
Johansson, T., *See* Nilsson, L.Y., 8:43242
Johnson, B.M., *See* Hauser, S.G., 8:44432
See Kreid, D.K., 8:44431
Johnson, C.H., Calculation of the energy-averaged scattering function from high resolution low-energy neutron scattering data, 8:44990 (J;US)
Johnson, G.L., *See* Dalder, E.N.C., 8:45262
Johnson, J.D., *See* Shaw, M.S., 8:44303
Johnson, K.J., Operation manual: mini-segmented gamma scanner, 8:44618 (R;US)
Johnson, M.B., Pion single and double charge exchange in the resonance region: Dynamical corrections, 8:45034 (J;US)
Johnson, M.R., Computer-based regulating control system for the Advanced Test Reactor, 8:43870 (R;US)
Johnson, R.J., *See* Crowley, J.S., 8:43563
Johnson, R.L., Design of the Advanced Toroidal Facility (ATF-1), 8:45199 (R;US)
Johnson, T.E., Product spin-offs from MIT Solar Building No. 5, 8:43629 (RA;US)
Johnson, W.B., Status of air quality simulation modeling, 8:44654 (RA;US)
Johnson, W.C., *See* DeAngelis, D.L., 8:44713
Johnson, W.L., *See* Howell, R.H., 8:44231
Johnston, D.R., Passive Solar Industries Council, 8:43486 (RA;US)
Joiner, W.C.H., *See* Anjaneyulu, Y., 8:45078
Jonassen, N., Ventilation, filtration and radon, 8:44666 (RA;DK;In Danish)
Jones, B., *See* Shastry, S., 8:45008
Jones, G.E. Jr., Fuel quality/processing study. Volume I. Overview and results, 8:43174 (R;US)
Fuel quality/processing study. Volume II. Literature survey, 8:43175 (R;US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8:43176 (R;US)
Fuel quality/processing study. Volume IV. On-site processing studies, 8:43177 (R;US)
Jones, H.G., *See* Quellet, M., 8:44736
Jones, J.E. Jr., Kentucky coal tests in a commercial Lurgi gasifier, 8:43153 (RA;US)
Jones, J.P. III, *See* Tao, J.C., 8:43150
Jones, M.E., Eigenfunction analysis of the beam—plasma instability with finite radial dimensions, 8:45167 (J;US)
See Mostrom, M.A., 8:44888
Jones, R., Negative-resistance characteristics of a Langmuir probe in a turbulent plasma, 8:45192 (J;IT)
Jones, R.H., *See* Andrews, W.B., 8:43333
Jones, R.L., Cyclic crack growth in high-temperature water-results of an international testing round robin, 8:43858 (RA;US)
Jones, R.W., Passive solar heating of buildings with attached greenhouse, 8:43573 (RA;US)
Jones, S.E., Experimental investigation of muon-catalyzed fusion in high-density deuterium-tritium mixtures, 8:45215 (R;US)
Joon, K., National Research Program Solar Energy. Progress report for the period ending 30 June 1979, 8:43478 (R;NL;In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1980, 8:43544 (R;NL;In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1981, 8:43545 (R;NL;In Dutch)
The National Research Program Solar Energy. Project overview first phase (1978-1981), 8:43477 (R;NL;In Dutch)
Jordan, D.R., Passive solar industry, 8:43483 (RA;US)
Jorgensen, J.L., *See* Kim, W.S., 8:44393
Jory, H., Varian gyrotrons in plasma experiments, 8:45209 (RA;US)
Judek, B., *See* Friedlander, E.M., 8:44982
Juentgen, H., Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8:43240 (R;DE;In German)
Juettner, B., *See* Siemroth, P., 8:45246
Jung, W., *See* Wolf, L., 8:44333
Jungers, R.H., *See* Sklarew, D.S., 8:44687
Jungwirth, K., Computer simulations of reflex E-beam systems and plasma, 8:45124 (RA;CS)
Dynamical model of an overheated magnetized plasma, 8:45127 (RA;CS)
Junior, P., Notes on RFQ beam current as a function of vane voltage, sparking limit, aperture and frequency, 8:44488 (RA;DE)
See Klein, H., 8:44522
Jupe, H., Time sequential sampling and elemental analysis of indoor and outdoor aerosol, 8:44671 (RA;DE)
Jura, Z., *See* Drozdowicz, B., 8:44656
Jurela, Z., Periodical dependence of physical parameters defining the yield of sputtered ions, 8:44868 (RA;SU)
Jurkowski, J., *See* Zhargal, Ch., 8:44596

Jurksch, G., Wind situation in the inland of the Federal Republic of Germany with regard to wind power utilization (especially planning of compound systems), 8:43682 (RA;DE;In German)
Jurney, E.T., *See* Raman, S., 8:44994
Jury, J.W., *See* Pywell, R.E., 8:44993
See Woodworth, J.G., 8:44977
Jusevicius, E., *See* Rahn, K.M.M., 8:43769
Justus, A.L., *See* Wynveen, R.A., 8:44697

K

Kadantseva, E.P., *See* Bakhvalov, N.S., 8:44500
Kadir, O., *See* Lightsey, G.R., 8:43524
Kadlec, E.G., *See* Braasch, R.H., 8:43709
Kadner, M., *See* Tress, G., 8:44386
Kado, H., *See* Elsen, E., 8:44917, 8:44918
Kafle, S.R.S., *See* Nash, J.K., 8:44322
Kaganove, J.J., *See* Gelbard, E.M., 8:45278
Kahn, L.M., Electric field gradient of single impurities in aluminum, 8:44220 (J;US)
Kaiser, K.W., Remote data acquisition and storage of periodic liquid uranium hexafluoride assay enrichments, 8:43413 (R;US)
Kakauridze, D.B., *See* Inyakin, A.V., 8:44625
Kako, T., First-excursion problems for Gaussian vector processes, 8:43943 (R;US)
Kalashnikov, A.G., *See* Glebov, A.P., 8:43839
Kalbach, R.M., Elastic scattering of π^{+-} and K^{+-} on protons at 100 and 200 GeV/c, 8:44923 (J;US)
Kallend, A.S., Chemical pathways from stack emissions to surface water, 8:44663 (RA;DK)
Kallis, J.M., *See* Garcia, A. III, 8:43494
Kallne, E., High-resolution x-ray spectra from molybdenum ions in the Alcator-C tokamak, 8:44892 (J;US)
Kallne, J., *See* Kallne, E., 8:44892
Kaltenthaler, G., Investigations on the transient version of URANUS, 8:43925 (RA;DE;In German)
See Boecking, G., 8:43923
Kam, F.B.K., *See* Stallmann, F.W., 8:43786
Kaminski, R.S., *See* Allen, R.E., 8:43828
Kaminskij, L.G., RTFAS automated system for image processing. System journal, 8:45294 (R;SU;In Russian)
Kaminsky, M., Surface effects in fusion device operation, 8:44151 (RA;SU)
Kamitakahara, W.A., *See* Woo, K.C., 8:44258
Kammerud, R., Building energy analysis of integrated passive designs, 8:43601 (RA;US)
Kamp, K.H., *See* Krischke, H., 8:43257
Kane, W.R., *See* Warner, D.D., 8:45011
Kang, W.M., *See* Tong, S.Y., 8:44218
Kangro, H.O., Development and application of radioimmunoassay methods for the serodiagnosis of intrauterine and congenital virus infections, 8:44780 (B;GB)
Kanisch, G., *See* Feldt, W., 8:44747
Kannberg, L.D., Results of recent research on aquifer thermal-energy-storage technical issues, 8:43974 (R;US)
Kanse, E.J., *See* Morgan, D.L. Jr., 8:44693
Kanter, E.P., *See* Vager, Z., 8:44900, 8:44902
Kanukhina, S.V., Void fraction and temperature in subcooled liquid flow in an annular channel, 8:43862 (R;SU;In Russian)
Kapitza, F., *See* Niessner, R., 8:44675
Kappel, M.J., Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8:44342 (J;US)
Kapustina, L.I., *See* Bogomolova, E.S., 8:44364
Karant, Y.J., *See* Friedlander, E.M., 8:44982
Karasaki, K., *See* Wilson, C.R., 8:44818
Karasev, B.G., *See* Baranov, G.A., 8:45230
Karlov, G.D., *See* Kaminskij, L.G., 8:45294
Karnaukh, V.A., *See* Vaulina, I.G., 8:45234
Karpenko, N.N., *See* Ivanchenko, Z.M., 8:45296
Karpenko, V.P., *See* Ryvkin, S.M., 8:44614
Kashcheev, V.M., Entrainment effect on burnout in disperced-annular flow (on the base of numerical experiment results), 8:43863 (R;SU;In Russian)
See Kanukhina, S.V., 8:43862
Kasherininov, P.G., *See* Ryvkin, S.M., 8:44614
Kaslow, J.F., New England Electric coal conversion experience, 8:43729 (RA;US)
Kass, J.N., *See* Hale, D.A., 8:43782
See Horn, R.M., 8:44175
Katayama, T., Japanese facilities for HIF accelerator development, 8:44559 (RA;DE)
See Nakanishi, T., 8:44470
Katrich, N.P., Some peculiarities of blister formation in metals under hydrogen ion bombardment, 8:44155 (RA;SU;In Russian)
Katsonis, K., First research coordination meeting on atomic collision data for diagnostics of magnetic fusion plasmas, Vienna, 21-25 June 1982. Summary report, 8:45112 (R;XA)
Kauffman, R.L., *See* Feldman, L.C., 8:44856
Kaufman, S.B., *See* Warwick, A.I., 8:44931
Kaul, A., *See* Heinrichs, K., 8:44802
Kaun, T.D., Method of making electrodes for electrochemical cell, 8:43979 (P;US)
Kaup, U., *See* Meyer, R.A., 8:45001
Kautsky, M., Relations between soil chemistry and moisture movement, 8:44711 (R;US)
Kawasaki, S., *See* Miyahara, A., 8:45217
Keafer, L.S. Jr., *See* Lawrence, J.D. Jr., 8:44661
Kearns, D.L., *See* Voytko, J.D., 8:43234
Keam, D.W., Annual review of research projects 1981, 8:44835 (R;AT)
Keane, C., *See* Suckewer, S., 8:44400
Kebadze, B.V., *See* Adamovskij, L.A., 8:43812
Keefe, D., Berkeley research program on ion induction linacs for inertial fusion, 8:44471 (RA;DE)
Keisch, B., *See* Lower, C.W., 8:43407
Kejlin, V.E., *See* Anashkin, O.P., 8:44377
Kelleher, P.J., *See* Miliaras, E.S., 8:43725
Keller, B.L., *See* Groves, C.R., 8:43397
Keller, D.V. Jr., Otisca T-Process: a new coal beneficiation approach for the preparation of coal slurries, 8:43253 (RA;US)
Keller, N.A., Autoradiography of metallic matrices, 8:43338 (R;CA)
Keller, R., Ion sources and low energy beam transport, 8:44521 (RA;DE)
Kellermann, H.J., *See* Feldt, W., 8:44747
Kelman, B.J., Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8:44786 (R;US)
Kenkeremath, L.D., *See* Entingh, D.J., 8:43653
See Gerstein, R.E., 8:43659
Kennedy, A.S., *See* Croke, K.G., 8:43997
Kenney, W.J., Conductor for a fluid-cooled winding, 8:44396 (P;US)
Kerker, M., *See* Cooper, D.E., 8:45273
Kerman, A.K., *See* Mulders, P.J., 8:44936
Kerr, W.C., *See* Bishop, A.R., 8:45086
Kessler, G., HIBALL - a conceptual design study of a heavy-ion driven inertial confinement fusion power plant, 8:45216 (RA;DE)
Keung, W., Beyond the static limit for quarkonium decays, 8:44942 (J;US)
Decay of the Higgs boson into heavy-quarkonium states, 8:44937 (J;US)
See Halzen, F., 8:44945
Khaldin, S.F., *See* Isaev, A.G., 8:44550
Khan, E.U., *See* Tress, G., 8:44386
Khan, M., *See* Marten, K., 8:43808
Khan, M.R., Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8:44204 (J;US)
Kharitonov, V.V., Transients in shock-excited homopolar generator with exciting winding as an inductive storage, 8:45229 (RA;SU;In Russian)
See Baranov, G.A., 8:45230
Kharitonov, Yu.V., *See* Fedulin, V.N., 8:43750
Kharkar, S., *See* Cross, W.H., 8:43446
Khataan, H.A., *See* Fenton, R.G., 8:44378
Kheifets, S., Application of the Green's function method to some nonlinear problems of an electron storage ring. Part II. Checking the method by a quadrupole pertubation, 8:44504 (R;US)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part III. Beam-size enhancement due to the presence of nonlinear magnets in a ring, 8:44507 (R;US)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part I. The Green's function for the Fokker-Planck equation, 8:44560 (R;US)
Khlebalkin, A.V., *See* Abroyan, I.A., 8:44271
Khodzhibagiyan, G.G., *See* D'yachkov, E.I., 8:44536
Khvashchevska, Ya., *See* Slapa, M., 8:44615
Kieffer, B.D., DOE Passive Commercial Demonstration Program update report, 8:43604 (RA;US)
Kilsdonk, D.J., *See* Kaun, T.D., 8:43979
Kim, B.R., *See* Lin, Y.S., 8:44730
Kim, D.S., *See* Morgan, D.T., 8:44104
Kim, W.S., Radiation-hard design principles utilized in CMOS 8085

microprocessor family, 8:44393 (R;US)
Kim Zaj Te, *See* Zhargal, Ch., 8:44596
King, A.R., *See* Birgeneau, R.J., 8:44293
King, G.B., Direct measurements of aerosol diffusion constants in the intermediate Knudsen regime, 8:44909 (J;US)
King, J.K., *See* Hinckley, B.S., 8:43654
King, J.W., Shenandoah Solar Total Energy Project, 8:43538 (RA;US)
King, N.M., U.K. programme in heavy ion fusion, 8:44965 (RA;DE)
Kinney, L.F., *See* Ashley, C.M., 8:44064
Kinnibrugh, D., *See* Baker, B., 8:44055
Kinnison, R.R., *See* Gilbert, R.O., 8:45306, 8:45307
Kinrys, S., Davies-Taylor equation for the fluidization bubble, 8:44419 (R;BR)
Kinser, D.L., *See* Aaron, W., 8:44248
See Sonder, E., 8:44459
Kirby, L.J., *See* Toste, A.P., 8:43396
Kirchgaessner, B., *See* Argyris, J.H., 8:43695
Kirsch, L., *See* Bensinger, J., 8:44925
Kirsch, L.E., Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983, 8:44911 (R;US)
Kirschenmann, H.J., Managerial attitude toward quality assurance, 8:43744 (R;US)
Kirshenbaum, N., Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8:43448 (RA;US)
Kiryushin, Yu.T., *See* Evdokimov, N.N., 8:44541
Kispert, L.D., *See* Samskog, P., 8:44361
Kistenev, Eh.P., *See* Gumenyuk, S.A., 8:44572
Kiziah, R.R., *See* Seidl, P.A., 8:44997
Kjellstroem, T., Toxicity studies of mercury in Japan, 8:44743 (R;SE;In Swedish)
Klabes, R., *See* Grotzschel, R., 8:44274
Klabunde, J., GSI Wideroe experiments, 8:44482 (RA;DE)
Klar, A., *See* Cambiaggio, M.C., 8:45032
Klatt, L.N., Analytical instruments in the coal preparation industry: current status and development needs, 8:43256 (J;US)
Klausnitzer, E., *See* Gerscha, A., 8:43753
Kleczkowski, A.S., Effect of coal burning on contamination of regional resources of underground water, 8:44738 (RA;DK)
Klei, H.E., *See* Sundstrom, D.W., 8:43457
Klein, A., *See* Auerbach, N., 8:45035
Klein, H., RFQ development at Frankfurt, 8:44522 (RA;DE)
Klein, J., *See* Juentgen, H., 8:43240
Kleit, J.A., Environmental control technology for aqueous effluents, 8:43237 (RA;US)
Klein, N., Overview of the regional market studies, 8:43480 (RA;US)
Klein, S., Hierarchial power control center analyzer. Volume 4. Appendixes and bibliography. Final report, 8:44042 (R;US)
Klein, S.A., *See* Duffie, J.A., 8:43575
See Parsons, B.K., 8:43645
Klein, W., *See* Goethel, G.F., 8:43236
Kleinkauf, W., *See* Drews, P., 8:43696
Klepper, M., Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience, 8:44074 (R;US)
Klett, F., *See* Kirshenbaum, N., 8:43448
Klima, R., Generalization of barometric formula for a sollisional plasma in a magnetostatic and rf fields, 8:45134 (RA;CS)
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation, 8:45118 (RA;CS)
See Datlov, J., 8:45242
Klimenko, S.P., Device for studying dimensional changes of reactor materials during irradiation in accelerators, 8:44159 (RA;SU;In Russian)
Klimenko, S.V., ATOM graphic package. Curve plotting, 8:45292 (R;SU;In Russian)
Atom graphic package. Space object plotting, 8:45293 (R;SU;In Russian)
See Kaminskij, L.G., 8:45294
Klimovskij, Yu.A., *See* Koval', A.G., 8:44144
Klockow, D., *See* Niessner, R., 8:44670, 8:44675
Klodt, G., *See* Buesing, J.W., 8:43627
Kloeck, K., Correlation of radiation sensitivity and nitrofurantoin sensitivity of Escherichia coli K-12, 8:44796 (R;DE;In German)
Klovning, A., *See* Berger, C., 8:44915
Kmiecik, J., Disposal of fly ash and wastewater using low-water hydraulic transport technique as a method for protection of surface and underground water from contamination, 8:43209 (RA;DK)
Knaak, R., *See* Woelk, G., 8:44092
Knapp, G.S., *See* Radousky, H.B., 8:44251
Knee, H.E., The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory, 8:43956 (BA;US)
Knezovich, J.P., *See* Harrison, F.L., 8:43877
Knief, R., Nuclear-fuel-cycle education: Module 6. Criticality safety, 8:43401 (R;US)
Knight, J.A., Entrained flow pyrolysis of biomass, 8:43435 (RA;US)
Knight, P.A., Building supplier as energy information center, 8:43485 (RA;US)
Knize, R.J., Theory of bulk gettering, 8:44296 (J;US)
Knox, H.D., *See* Koehler, P.E., 8:44988
Knox, J.B., Atmospheric modeling and environmental protection needs, 8:44655 (RA;US)
Program report for FY 1982: Atmospheric and Geophysical Sciences Division of the Physics Department, 8:44691 (R;US)
Knutson, W.K., *See* Rodriguez, C.F., 8:44127
Knutzen, J., *See* Bjerkeng, B., 8:43199
Kobayashi, M., *See* Larter, R., 8:44335
Kobayashi, N., *See* Miyahara, A., 8:45217
Kober, E.M., Theoretical model for the luminescing excited states of Ru $(bpy)_3^{2+}$ and Os$(bpy)_3^{2+}$ (bpy = 2,2'-bipyridine), 8:44334 (R;US)
Kobos, A.M., Optical potential description of $^{16}O+^{28}Si$ elastic scattering, 8:44991 (J;NL)
Koch, R.H., Flicker (1/f) noise in tunnel junction DC SQUIDS, 8:44398 (J;US)
Kochin, V.N., *See* Klimenko, S.V., 8:45292, 8:45293
Kochkin, V.A., *See* Glazov, A.A., 8:44494
Koehler, D., Application of radioactive aerosols in diagnostic techniques of bronchial obstructions in the clinical practice, 8:44771 (RA;DE;In German)
Koehler, P.E., Structure of ^{12}B from measurement and R-matrix analysis of sigma(theta) for $^{11}B(n,n)^{11}B$ and $^{11}B(n,n')^{11}Bsup(*)(2.12$ MeV), and shell-model calculations, 8:44988 (J;NL)
Koelling, D.D., *See* Arko, A.J., 8:44223
Koenders, N.J., Calculation method of the power generation costs of a nuclear power plant, 8:44019 (R;NL;In Dutch)
Koeppel, W., Construction and testing of a wind park on the Cyclade island of Kythnos, 8:43704 (RA;DE;In German)
Koerbel, S., *See* Datlov, J., 8:45117
See Kryska, L., 8:45120
See Preinhaelter, J., 8:45243
See Stoeckel, J., 8:45122
Koerber, F., GROWIAN - planning of the measurement- and test programme, 8:43692 (RA;DE;In German)
Koestel, A., *See* Gido, R.G., 8:43942
Koestner, R.J., Molecular structure of hydrocarbon monolayers on metal surfaces, 8:44353 (J;US)
Kol'ga, V.V., *See* Glazov, A.A., 8:44494
Kolacek, K., Apparatus for plasma electron temperature and density measurements by Thomson scattering, 8:45130 (RA;CS)
Kolb, C.R., Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume I, 8:43371 (R;US)
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume II, 8:43372 (R;US)
Kolb, E.W., *See* Freese, K., 8:44829
Kolesnikov, Yu.M., *See* Evdokimov, N.N., 8:44541
Kollie, T.G., *See* Bell, R.T., 8:44209
Kolobashkin, V.M., *See* Bogomolova, E.S., 8:44364
Komarov, F.F., *See* Belyj, I.M., 8:44276
Komendantova, G.A., *See* Belov, A.G., 8:44545
Komlev, V.P., Installation for measuring angular correlation of two-photon annihilation of positrons in a condensed medium, 8:44576 (R;SU;In Russian)
Komoriya, H., Quantitative software reliability analysis in nuclear safety, 8:43960 (BA;US)
Komurka, M., LWR loss of coolant accidents and conservatism in the anticipated release of iodine, 8:43946 (R;AT;In German)
Kondepudi, D.K., Chiral-symmetry breaking in nonequilibrium systems, 8:45087 (J;US)
Kondo, T., Fatigue crack growth through typical weld HAZ microstructures of SA 533 Gr. B steel in BWR water environment, 8:43754 (RA;US)
See Shoji, T., 8:43859
Konin, A.D., *See* Bystritskij, V.M., 8:44544

Konuk, A.A., Design of heat exchangers by numerical methods, 8:44417 (R;BR;In Portuguese)
Simulation of thermal transients using CSMP, 8:44416 (R;BR;In Portuguese)
See Baptista Filho, B.D., 8:44420
Kooman, J.L., *See* van Holten, Th., 8:43715
Kopecky, V., *See* Datlov, J., 8:45117, 8:45242
See Stoeckel, J., 8:45122
Kopp, M.K., Neutron detection apparatus, 8:44624 (P;US)
Koptelov, Eh.A., *See* Golubev, N.A., 8:44160
Korenev, S.A., Bywalled plasma formation in vacuum prolonged channels, 8:45144 (R;SU;In Russian)
Kosarev, P.M., *See* Arsenin, V.V., 8:45106
Kosowski, G., *See* Onischak, M., 8:43422
Kosowski, G.M., Development of biomass gasification to produce substitute fuels, 8:43428 (RA;US)
Kosterov, A.A., *See* Bondarenko, G.G., 8:44277
Kostyk, N.L., Cities, states, and national laboratories: an account of productive interaction, 8:44003 (RA;US)
Kotecki, D.E., Optical shutters using microchannel plate (MCP) intensifier tubes, 8:44645 (R;US)
Kothmann, R.E., Low hydrostatic head electrolyte addition to fuel cell stacks, 8:44058 (P;US)
Koucky, R.W., *See* Darling, S.L., 8:43162
Koumvakalis, N., *See* Merkle, L.D., 8:44265
Kouts, H., *See* Takahashi, H., 8:43836
Koutsandreas, J.D., Remote sensing for environmental protection, 8:44000 (RA;US)
Kouvel, J.S., *See* Radousky, H.B., 8:44251
Kouveliotou, C., Observations of fast, transient gamma-ray phenomena, 8:44826 (R;DE)
Kovac, R.J., *See* Knight, J.A., 8:43435
Koval', A.G., Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8:44144 (RA;SU;In Russian)
Kovrizhnykh, A.M., *See* Vyskochil, S., 8:44593
Kowal, A.L., *See* Dziubek, A.M., 8:43200
Koyama, A., Theory of the secondary electron emission from Al by high energy proton or α-particle bombardment, 8:44146 (RA;SU)
Kozak, J.J., *See* Davidson, R., 8:44886
Kozin, A.I., *See* Dekhtyar, I.Ya., 8:44165
See Ibragimov, Sh.Sh., 8:44273
Kozlowski, Z.A., *See* Dietrich, Yu., 8:44496, 8:44497
Kponou, A., *See* Sluyters, T., 8:44512
Kraft, M., Solar thermal power plant 30/50 kWsub(e), 8:43533 (R;DE;In German)
Kram, T., *See* van Dijkum, P.H., 8:44077
Krasulin, Yu.L., *See* Gusev, V.M., 8:44150
Krause, M.O., Population of the three major exit channels in the 3d resonance region of atomic gallium, 8:44895 (J;US)
See Fahlman, A., 8:44894
Kravarik, J., Development of current sheat on output of coaxial gun, 8:45125 (RA;CS)
Krebs Larsen, F., *See* Bundgaard, J., 8:44640
Krehbiel, H., *See* Bartel, W., 8:44916
Kreid, D.K., Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model, 8:44431 (R;US)
See Hauser, S.G., 8:44432
Kreider, J.F., Walker Field passive solar heating system, 8:43610 (RA;US)
Kreissig, U., *See* Grotzschel, R., 8:44274
Kreith, F., *See* Fruchter, E., 8:43649
Krejcik, P., Hollow beam concept for producing intense beams, 8:44489 (RA;DE)
Kretov, A.P., *See* Glagolev, V.V., 8:44600, 8:44603
Krischke, H., Planning, construction and operation of the 6 MWsub(th)-test facility Koenig Ludwig for firing bituminous coal in an atmospheric fluidized bed furnace, 8:43257 (R;DE;In German)
Krishtal, M.A., Effect of difference in impurity and matrix atom scattering cross-section on dislocation pinning under neutron irradiation, 8:44166 (RA;SU;In Russian)
Mechanisms of amplitude- and time dependence of internal friction due to radiation defects, 8:44167 (RA;SU;In Russian)
Kristen, H.R., Oxygen-perovskites with fourvalent rare earth metals, 8:44346 (B;DE;In German)
Krivykh, A.V., *See* Anashkin, O.P., 8:44377
Krlin, L., Global model of a hybrid tokamak reactor with an auxiliary rf heating, 8:45248 (RA;CS)
See Klima, R., 8:45134
Kroeger, W., *See* Ehrhardt, J., 8:43927
Krohn, H., *See* Ehrhardt, K.D., 8:43922
Krommes, J.A., Topics in the theory of statistical closure approximations for plasma physics, 8:45149 (R;US)
Kroner, W.M., Building energy code input form with instructions for completion, 8:44068 (R;US)
Building energy performance standards. Phase IV. Code parameter list and code format listing, 8:44070 (R;US)
Development of a building energy-code input form, 8:44072 (R;US)
Evaluation of building-code descriptors, 8:44071 (R;US)
Krop, E., *See* Laczny, M.J., 8:44737
Kropp, F., *See* Dolan, L.S., 8:43513
Kruckewitt, T.W., *See* Hillesland, T. Jr., 8:43711
Krueger, D.A., Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8:43277 (R;US)
Krueger, K.W., *See* Kalbach, R.M., 8:44923
Kruer, W.L., *See* Estabrook, K., 8:45164, 8:45165
Kruglyakov, Eh.P., Experimental investigation of high-current REB interaction with plasma, 8:45123 (RA;CS;In Russian)
Krummacher, S., *See* Eberhardt, W., 8:44896
Krupke, W.F., *See* Emmett, J.L., 8:44408
Kruse, H., *See* Buchwald, G., 8:44531
Krynicki, J., *See* Grotzschel, R., 8:44274
Kryska, L., Andromeda - the system for the acquisition and numerical data processing and its application for experimental device tokamak TM-1-MH, 8:45120 (RA;CS)
See Datlov, J., 8:45117
See Stoeckel, J., 8:45122
Kryutchenko, E.V., *See* Berezhnoj, V.A., 8:44570
Ku, H.C., *See* Woolf, L.D., 8:44249
See Yang, K.N., 8:44242
Kubes, P., *See* Kravarik, J., 8:45125
Kuble, G., Determination of condensation nuclei using a modified Aitken method, 8:44668 (RA;DE;In German)
Kubyshkin, A.N., *See* Tel'kovskij, V.G., 8:44268
Kuckertz, T.H., *See* Nicholson, N., 8:43406
Kudinov, V.I., *See* Komlev, V.P., 8:44576
Kuehn, L., Systematic studies on coals of different deposits, including their mineral matter, 8:43190 (R;DE;In German)
Kuemmerle, W., *See* Argyris, J.H., 8:43695
Kuenstler, K., Heat pipe - a heat conductor of high efficiency, 8:44435 (R;DD;In German)
Kueny, A., *See* Khan, M.R., 8:44204
Kuhlmann, E., Alpha capture into the giant quadrupole resonance in ^{28}Si, 8:44992 (J;US)
Kujawska, J., Radiation therapy of cancer of the lung, 8:44775 (R;PL;In Polish)
Kulagin, N.T., Ensuring by multigroup constants for calculations of photoneutron sources, 8:45002 (R;SU;In Russian)
Kullberg, R., *See* Herrstroem, N.-Y., 8:44976
Kumagai, K., Effect of superconductivity on spin dynamics in (Y/sub 1-x/R/sub x/)Rh$_4$B$_4$, 8:44252 (J;US)
Kumamaru, H., Survey of studies on the flow and heat transfer of two-component, two-phase flow of liquid metal in magnetic field, 8:45268 (RA;JP;In Japanese)
Kummerer, K., Irradiation experiment Mol-7B, 8:43809 (R;DE;In German)
Kunaev, G.T., *See* Babalin, A.I., 8:45231
Kunc, J.A., Analysis of the asymmetric part of electron—electron Boltzmann integral, 8:45156 (J;US)
Kunz, A.B., Concerning the trapping of positrons in ionic solids, 8:44318 (BA;NL)
Kuo, J.C.W., Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981, 8:43423 (R;US)
Kupchishin, A.I., *See* Dekhtyar, I.Ya., 8:44165
Kurath, D., *See* Geesaman, D.F., 8:44985
Kurkowski, T.L., Design of passive commercial buildings: background and major lessons learned, 8:43590 (RA;US)
Kurnaev, V.A., *See* Ajnetdinov, E.B., 8:44855
Kushner, M.J., Large-bore copper-vapor lasers: Kinetics and scaling issues, 8:44402 (J;US)

Kusno, D., Conventional approach to the problem of the deuteron smearing corrections, 8:44970 (J;US)
Kusubov, A.S., *See* Swift, R.P., 8:44462
Kutter, R., Contribution to improving reliability assessments of mechanical structural components requiring a high degree of safety using weighted Monte Carlo simulation, 8:44446 (R;DE;In German)
Kuuskraa, V., Conceptual models for gas hydrates. Phase I. Technical Directive 6. Final report, 8:43295 (R;US)
Kuz'min, E.S., Transport channel for extracted proton beam of JINR phasotron, 8:44538 (R;SU;In Russian)
Kuznetsov, A.B., Effect of nonlinear ion space charge forces on the ion beam parameters of a collective accelerator, 8:44498 (R;SU;In Russian)
Kuznetsov, A.N., *See* Belov, A.G., 8:44540
Kuznetsov, V.I., Temperature distribution in targets irradiated by heavy ions, 8:44546 (R;SU;In Russian)
Kuznetsov, Yu.K., Plasma equilibrium in a three-turn stellarator with correcting cross field, 8:45252 (R;SU;In Russian)
Kvick, T., *See* Fredriksson, U., 8:43717
Kwiatkowski, K., Energy deposition in intermediate-energy nucleon-nucleus collisions, 8:44989 (J;US)
Kykta, M.P., *See* Buisson, J.P., 8:44291

L

Lacina, J., Interaction of an electromagnetic wave with an inhomogeneous plasma slab, 8:45113 (R;CS)
Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma, 8:45137 (RA;CS)
Lackas, W., *See* Berger, C., 8:44915
Laclare, J.L., Coasting beam instabilities in storage rings, 8:44557 (RA;DE)
Laczny, M.J., Model of ion equilibrium in aqueous solutions of fly ash in the context of prediction of ground and surface water contamination, 8:44737 (RA;DK)
Lagow, R.J., New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report, 8:43664 (R;US)
Laichter, Y., *See* Geissel, H., 8:45041
Lakner, A., *See* El-Bassioni, A., 8:43958
Lam, P.K., Calculation of high-pressure phases of Al, 8:44211 (J;US)
Lambert, S.E., *See* Woolf, L.D., 8:44249
See Yang, K.N., 8:44242
Lampe, F.W., *See* Senzer, S.N., 8:44337
Lance, E.D., *See* Corbett, B.L., 8:43893
Landau, M., Information report on state legislation, 8:43365 (R;US)
Lande, K., *See* Cherry, M.L., 8:44830
Landrum, J.H., *See* Hicks, H.G., 8:45003
Lane, R.O., *See* Koehler, P.E., 8:44988
Lang, M., Phase change materials in masonry construction, 8:43650 (RA;US)
Langbein, K., *See* Klein, H., 8:44522
Lange, C.H., *See* Hale, D.A., 8:43782
See Horn, R.M., 8:44175
Langfeldt, J.N., Full scale tests with oil recovery systems offshore. Norway, June 1980, 8:43287 (R;NO)
Langhoff, J., First experiences and results of the 200 T/D pilot plant Bottrop, 8:43155 (RA;US)
See Duerrfeld, R., 8:43151
Langhoff, J. Schaefer, W., RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8:43152 (RA;US)
Lappus, G., Computer program GANBEO, 8:43299 (R;DE;In German)
Supervision and control of gas transportation and distribution systems, 8:43300 (R;DE;In German)
Laret, L., *See* Heikhaus, H., 8:44079
Lari, R.J., Survey of eddy-current programs, 8:44441 (R;US)
See Turner, L.R., 8:44440
Larionov, B.A., *See* Baranov, G.A., 8:45230
Larionov, M.M., *See* Bulyginskij, D.G., 8:45116
Larios, G., *See* Blancas, A., 8:43521
Larsen, I.L., *See* Cutshall, N.H., 8:44719
Larsen, R.J., Worldwide deposition of ^{90}Sr through 1981, 8:44716 (R;US)
Larson, N.M., *See* Johnson, C.H., 8:44990
Larsson, M., *See* Hahn-Haegerdal, B., 8:43467
Larter, R., Derived sensitivity densities in chemical kinetics: A new computational approach with applications, 8:44335 (J;US)
Lassahn, G.D., LOFT uncertainty-analysis methodology, 8:43886 (R;US)
Lassmann, K., Use of the URANUS code at Karlsruhe Nuclear Research Center, 8:43926 (RA;DE;In German)
See Boecking, G., 8:43923
Latanision, R.M., *See* Ballinger, R.G., 8:44177
Lathrop, G.H., *See* Dalder, E.N.C., 8:45262
Latta, B.M., Multiple scattering of 57 keV ^{29}P in Si, 8:44875 (RA;SU)
Lau, K.H., *See* Wood, B.J., 8:43170
Laubacher, D.B., Muonic x-ray measurement of the monopole and quadrupole charge parameters of /sup 154-158,160/Gd, 8:45012 (J;US)
Laude, H., Site selection for wind power plants, 8:43681 (RA;DE;In German)
Lauer, R., *See* Feldt, W., 8:44747
Laureana, R., *See* Grimont, B., 8:44562
Laurikainen, P., *See* Zajmidoroga, O.A., 8:44581
Laurikajnen, P., *See* Vishnyakov, V.V., 8:44584
Lawrence, J.D. Jr., Remote sensing of the environment, 8:44661 (RA;US)
Lawrence, J.M., *See* Thompson, J.D., 8:44221
Layne, C.B., *See* Long, M.B., 8:44369
Lazareth, O., *See* Ragheb, M.M.H., 8:45282
Le Grand, J., Methodology and practical basis for emergency planning in case of accidental releases, 8:43880 (BA;US)
Leaf, G., *See* Chawla, T.C., 8:45279
Leal, L.C., Calculation of the Kernel scattering for thermal neutrons in H_2O and D_2O, 8:43795 (RA;BR;In Portuguese)
Lear, R., *See* Kotecki, D.E., 8:44645
Lebech, B., *See* Bundgaard, J., 8:44640
Lebedev, S.Ya., Investigation of the angular distributions of the sputtered atoms of gold monocrystals, 8:44849 (RA;SU;In Russian)
Lebrun, J., *See* Heikhaus, H., 8:44079
Lebrun-Grandie, P., *See* Baron, J.C., 8:44762, 8:44764, 8:44765
Lechner, R., *See* Axmann, A., 8:43887
Leczny, M.J., *See* Kleczkowski, A.S., 8:44738
See Kmiecik, J., 8:43209
Lederman, L., *See* Spiegelberg, R.deS.H., 8:43844
Ledgerwood, R.K., *See* Diediker, L.D., 8:43379
Lednev, A.A., *See* Inyakin, A.V., 8:44625
Lee, C.K., Preparation of permselective membranes by means of radiation induced grafting. Part of a coordinated programme on radiation modified polymers for biomedical and biochemical applications. Final report for the period 1 August 1980 - 31 August 1982, 8:44360 (R;XA)
See Cherry, M.L., 8:44830
Lee, D.J., *See* Brown, D.J., 8:43339
Lee, D.M., Assay of spent fuel by a simple reactivity method, 8:43331 (J;US)
Lee, J., *See* Anjaneyulu, Y., 8:45078
Lee, J.D., US-DOE Fusion-Breeder Program: blanket design and system performance, 8:45263 (R;US)
Lee, K., *See* Skupsky, S., 8:45270
Lee, S.S., Repeated fed-batch rapid fermentation using yeast cells and activated carbon extraction system, 8:43469 (J;US)
See Wang, H.Y., 8:43462
Lee, V.E., *See* Franklin, A.L., 8:44085
Lee, Y.H., Reactor optimization for enzymatic hydrolysis of cellulose, 8:43461 (J;US)
Lee, Y.T., *See* Bailey, D., 8:44842
Leese, K.E., *See* Green, D.A., 8:43217
Lefort, G., Safety of storage facilities for LMFBR spent fuels, 8:43342 (R;FR;In French)
Legler, H., *See* Jochem, E., 8:44025
Legnini, D.G., *See* Smedskjaer, L.C., 8:44230
Lehar, A., *See* Cannon, M., 8:45090
Lehman, D.R., *See* Gibson, B.F., 8:44938
Lehmhus, R., Examination of the documents prepared for the construction of the rotor blades GROWIAN I, 8:43691 (RA;DE;In German)
Leighly, H.P., *See* Alam, A., 8:44229
Leijon, B., *See* Doe, T.W., 8:43363
Leino, M.E., *See* Meyer, R.A., 8:45001
Leister, K.H., Simulation irradiation of binary copper alloys, 8:44168 (RA;DE;In German)
See Boecking, G., 8:43923
Lempicki, A., *See* Andrews, L.J., 8:43646
Lenahan, P.M., *See* Dodson, B.W., 8:44351
Leon, M., *See* Brown, J.A., 8:44307
See Jones, S.E., 8:45215
Leon, R.L., *See* Coggiola, M.J., 8:44449
Leonard, L.E., Passive solar Alaskan school, 8:43591 (RA;US)
Lepori, W.A., *See* Soltes, E.J., 8:43443
Lepp, R.M., Control and instrumentation systems for the 600 MWe CANDU

PHW nuclear power plants, 8:43867 (R;CA)
See Tseng, C.M., 8:43796
Lerche, R.A., *See* Carey, R.W., 8:45265
Lesk, I.A., Glass diffusion source for constraining BSF region of a solar cell, 8:43512 (P;US)
Leskovar, B., Recent advances in high-speed photon detectors, 8:44619 (R;US)
Lester, T.W., *See* King, G.B., 8:44909
Leuckel, W., *See* Hedden, K., 8:44013
Leung, K.N., *See* Ehlers, K.W., 8:44889
Leveque, G., Reflectance spectra and dielectric functions for Ag in the region of interband transitions, 8:44219 (J;US)
Levin, G.B., Regional compacting for low-level waste management: an innovative approach in national problem solving, 8:43351 (R;US)
Levin, L.S., *See* Bulyginskij, D.G., 8:45116
Levine, J.S., ECH current drive on the ISX-B tokamak, 8:45096 (RA;US)
Levine, S.H., Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8:43829 (R;US)
Levret, A., Determination of seismic reference motions on nuclear sites in France, 8:43875 (R;FR;In French)
Levy, E., *See* Winter, S., 8:43636
Lewtas, J., *See* Sklarew, D.S., 8:44687
Lhermitte, F., *See* Baron, J.C., 8:44765
Li, K., Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8:43163 (R;US)
Li, Y.H., Ultimate removal mechanisms of elements from the ocean, 8:44749 (J;GB)
Lichtenstadt, J., *See* Altman, A., 8:44981
Lieb, K.P., *See* Casten, R.F., 8:45022
Liebgott, H., Flue gas desulphurization in a spray tower with de-coupled recycling of soda ash, 8:43735 (R;DE;In German)
Liebowitz, D., Search for fractional charges, 8:44924 (J;US)
Liem, H., Studies on the leaching and weathering processes of coal ashes, 8:43201 (RA;DK)
Lienhard, H., Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8:43231 (RA;US)
Lightsey, G.R., Use of plastic construction materials in small-scale fuel alcohol production, 8:43524 (J;US)
Lillestoel, E., *See* Berger, C., 8:44915
Lim, E.Y., Fracture mechanics evaluation of reactor piping reliability. Pt. 2. Simulation of pipe rupture probability, 8:43966 (BA;NL)
Lim, K.C., Electronic density of states and T/sub c/ in Nb_3Sn under pressure, 8:44226 (J;US)
Lim Khen Tkhek, *See* Zhargal, Ch., 8:44596
Lin, Y.S., Decomposition and transport of monochloramine in freshwater, 8:44730 (RA;DK)
Lindgard, P., Correlation theory for one dynamical variable: Application to EuO and EuS, 8:44254 (J;US)
Lindgren, C., *See* Fredriksson, U., 8:43717
Lindkvist, B., *See* Jakobsson, B., 8:45000
Lindner, E.N., *See* Verslvis, S., 8:44820
Lindquist, L.O., *See* Lee, D.M., 8:43331
Lindstrom, P., *See* Crawford, H., 8:44880
Lindstrom, P.J., *See* Crawford, H.J., 8:44553
Linev, A.F., *See* Bykov, V.I., 8:44551
Linford, R.K., *See* Spencer, R.L., 8:45182
Lipinsky, E.S., *See* Hillman, M., 8:43451
Lisitsyna, T.S., *See* Glebov, A.P., 8:43839
Liss, J.E., Sour felling, 8:43502 (R;SE;In Swedish)
Litman, R., *See* Stringer, R.P., 8:43230
Littenberg, L.S., BNL AGS - a context for kaon factories, 8:44510 (R;US)
Little, J.W., Radiative decay of surface plasmons on nonspherical silver particles, 8:44837 (R;US)
Littlestone, N., *See* Chan, T., 8:43361
Littman, J.E., *See* Zurawsky, W.P., 8:44297
Liu, C.Y., *See* Ismail, K.A.R., 8:44382
Liu, H.C., Investigations of defective β-NiAl by transmission electron microscopy, 8:44234 (BA;US)
Liu, L.C., Diffraction theory and the double-charge-exchange reaction $^{18}O(\pi^+,\pi^-)\,^{18}Ne$, 8:44983 (J;US)
See Ohkubo, Y., 8:45007
Liu, N.L.H., *See* Emin, D., 8:45075
Liu, S., *See* Hsu, F.H., 8:44233
Liu, S.H., *See* Shaheen, S.A., 8:44224
Livingston, R.S., Government development and export policies, 8:44017 (R;AU)
Loeffler, F., *See* Mothes, H., 8:44672
Loehr, B., Variation of the strong coupling constant from a measurement of the jet energy spread in e^+e^- annihilation, 8:44928 (J;NL)
Loewenschuss, A., *See* Schrader, D.M., 8:44317
Lohmann, C., *See* Langhoff, J. Schaefer, W., 8:43152
Lombardo, N., *See* Barnhart, J., 8:43255
Lomdahl, P.S., *See* Bishop, A.R., 8:45086
Long, J.C.S., *See* Wilson, C.R., 8:44818
Long, K.A., *See* Tahir, N.A., 8:44532
Long, M.B., Instantaneous Ramanography of a turbulent diffusion flame, 8:44369 (J;US)
Lonngren, K.E., *See* Chan, C., 8:45183
Loo, H., *See* Baron, J.C., 8:44763
Loos, H.G., Data reduction for aerosol coagulation experiments with wall loss. Topical report No. 1, 8:44664 (R;US)
Loose, V.W., *See* Burris, A.E., 8:43981
Lopert, R.B., Measured stimulated Raman gain in methane, 8:44401 (R;US)
Lorenz, A., *See* Katsonis, K., 8:45112
Loring, M., Fusion gyrotron development status, 8:45204 (RA;US)
Lornell, R., Solar energy quick reference guide, 8:43481 (R;US)
Loshchinin, V.M., *See* Vorob'ev, V.A., 8:43854
Loss, F.J., *See* Cullen, W.H., 8:43752, 8:43781
Lotfalian, M., *See* Schlueter, R.A., 8:43722
Lototskij, A.P., *See* Ivanov, I.A., 8:45221
Louis, H., *See* Schock, R.N., 8:44822
Louni, L., Chloride permeability of large unilamellar lipidic vesicles, 8:44757 (R;FR)
Love, W.G., *See* Baker, F.T., 8:45009
Lovell, T.W., *See* Sprott, J.C., 8:43969
Lower, C.W., Data-acquisition system for the NLO error-propagation exercise, 8:43407 (R;US)
Loxsom, F., *See* Doderer, E., 8:43618
Lu, F., *See* Cross, W.H., 8:43446
Lubarda, V., Thermodynamic analysis of elastic-plastic deformation, 8:45080 (R;BR)
Lucht, R.A., *See* Armstrong, R.A., 8:45188
Luckas, B., Occurrence and differentiated analysis of mercury compounds in oceanic animals, 8:44741 (R;DE;In German)
Lacot, Michel, ISABELLE-4 loop: a PWR testing loop loaded and unloaded in the pool of the Osiris reactor, 8:43884 (R;FR;In French)
Ludeking, L.D., Microscopic formalism for intermediate energy transfer reactions: Application to the (p,*d*) and (d,p) reactions, 8:44979 (J;US)
Ludwig, J., *See* Behrend, E., 8:43732
Luerig, H.J., Investigation of stress of man caused by work and climate in salt mining, 8:43400 (R;DE;In German)
Lui, Z.P., *See* Chen, C.T., 8:44344
Luitjens, S.B., Energy spectra of neutral particles measured with the time-of-flight and the stripping techniques, 8:44854 (RA;SU)
Lumpov, V.N., *See* Evgrafov, G.N., 8:44632
Luna, R.E., Generic evaluation of the radiological impacts of transportation in the nuclear fuel cycle, 8:43334 (R;US)
Lund, A., *See* Samskog, P., 8:44361
Lund, S.E., *See* Shuster, R., 8:43471
Lundgren, T., *See* Hartlen, J., 8:43195
Lupil'tsev, V.P., *See* Zrelov, V.P., 8:44542
Lutha, R., *See* Burke, R., 8:43621
Luther, F.M., *See* Knox, J.B., 8:44691
Lutz, P., Discontinuous mass chlorination of natural draft cooling towers, 8:44740 (RA;DK)
Luxenberg, P., Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8:44332 (B;DE;In German)
Lyashchenko, B.G., *See* Makarov, A.A., 8:45065
Lyczkowski, R.W., Development of a local void-defect model which accounts for yield losses caused by flow nonuniformities, 8:43303 (R;US)
Lydell, B.O.Y., System reliability engineering in the Swedish nuclear regulatory process, 8:43957 (BA;US)
Lynch, D.W., *See* Leveque, G., 8:44219
Lynch, E.P., *See* Santini, D.J., 8:44652
Lynch, J.E., *See* Bobrowicz, F.W., 8:45049
Lynch, J.F., *See* Snead, C.L. Jr., 8:44228
Lynette, R., Wind power operations and maintenance, 8:43713 (RA;US)
Lyngvig, J., Prevention of water pollution by the use of fly-ash as a substitute for extracted raw materials, 8:43206 (RA;DK)
Lynn, K.G., *See* Fischer, D.A., 8:44304
See Schultz, P.J., 8:44205
See Snead, C.L. Jr., 8:44228
Lyo, S.K., Theory of dephasing of impurities in glasses, 8:44285 (R;US)
Lyon, J.F., *See* Johnson, R.L., 8:45199
See Rome, J.A., 8:45195
Lyon, W.S., Nuclear and x-ray techniques, 8:44662 (RA;US)

Lysne, P.C., Dielectric relaxation in insulators slightly damaged by stress pulses, 8:44295 (J;US)
Electrical response of relaxing dielectrics compressed by arbitrary stress pulses, 8:45072 (J;US)
Lysova, G.V., *See* Lebedev, S.Ya., 8:44849
Lytkin, L.K., *See* Zajmidoroga, O.A., 8:44581
Lytle, R.J., Alternative methods for determining the electrical conductivity of core samples. II, 8:44456 (J;US)
Lyudmirskij, Eh.A., Measurement of proton beam intensity and efficiency at slow extraction, 8:44534 (R;SU;In Russian)

M

Ma, K.B., *See* Chui, S.T., 8:44225
Ma, S., *See* Cork, D.J., 8:44781
Mabile, M., *See* Puill, A., 8:43762
MacArthur, J.D., *See* Latta, B.M., 8:44875
MacCracken, M.C., *See* Knox, J.B., 8:44691
See Walton, J.J., 8:44690
MacDonald, P.E., *See* Appelhans, A.D., 8:43903
MacDonald, R.J., Photon emission from ion bombarded solids, 8:44862 (RA;SU)
Variation of spot intensity in monocrystal ejection patterns as a function of the ion incidence, 8:44850 (RA;SU)
MacDougall, C.S., Studies on the reaction of nitric acid and sugar, 8:44354 (J;US)
Macek, R.W., *See* Ware, A.G., 8:43905
Machacek, R., Economic and energy audit of converting waste plastics to oil. Final report, 8:44102 (R;US)
Economic and energy audit of textile foam processing, 8:44103 (R;US)
Machens, U., Measurements on a 15 kW-wind power plant. Phase 2, 8:43685 (RA;DE;In German)
Mack, K.L., *See* Green, D.A., 8:43217
Mackintosh, R.S., *See* Kobos, A.M., 8:44991
Macmillan, D.C., *See* Nissen, D.A., 8:44647
Macosko, C.W., Flow in porous media, phase behavior and ultralow interfacial tensions: mechanisms of enhanced petroleum recovery. Final report, 8:43270 (R;US)
Maczuga, J., *See* Andrews, G.F., 8:43187
Madeira, A.A., New model for simulation of pressurizers in PWR type reactors, 8:43773 (R;BR;In Portuguese)
Madelaine, G., *See* Boulaud, D., 8:44634
See Metayer, Y., 8:44669
See Perrin, M.L., 8:44700
Madsen, B., *See* Andersen, L.J., 8:43203
Madsen, M.M., The benchmarking of RADTRAN II, 8:43335 (R;US)
Truck transportation of radioactive materials, 8:43336 (R;US)
See Luna, R.E., 8:43334
Maeda, K.T., Suncatcher monitoring project, 8:43582 (RA;US)
Magee, C.W., *See* Sadana, D.K., 8:44299
Magee, R.A., *See* Corbett, W.E., 8:43232
Maggiore, C.J., *See* Srinivasan, S., 8:44054
Magnuson, D.W., *See* Allison, S.W., 8:44639
Magula, P., Soft X-ray diagnostics on tokamak TM-1-MH, 8:45121 (RA;CS)
See Datlov, J., 8:45117
See Stoeckel, J., 8:45122
Mahan, G.D., Intrinsic defects in ZnO varistors, 8:44287 (J;US)
Mahaux, C., *See* Johnson, C.H., 8:44990
Maidment, J.R.M., Final focusing of 10 GeV bismuth ions, 8:44525 (RA;DE)
Maier, K.H., Structure of ^{209}Bi deduced from the ^{208}Pb(t,2nγ) reaction, 8:45017 (J;US)
Maier, W.B., Visible and ultraviolet absorption spectrum of UCl_6 dissolved in liquid Xe, 8:44313 (J;US)
Maiorino, J.R., Calculation of the thermal disadvantage factor for a reactor cell with anisotropic scattering by the Fn method, 8:43846 (RA;BR;In Portuguese)
See Faya, A.J.G., 8:43864
Maire, D., *See* Duco, J., 8:43881
Majkrzak, C.F., Neutron-diffraction study of the magnetic ordering in superconducting $TmRh_4B_4$, 8:44253 (J;US)
Makarov, A.A., Effect of temperature on atom-atom collision chain length in metals, 8:45065 (RA;SU;In Russian)
Makashin, I.N., *See* Arsenin, V.V., 8:45106
Makhlin, N.A., *See* Bondarenko, G.G., 8:44154, 8:44277
Makhlyueva, I.V., *See* Gorichev, P.A., 8:44578
Makin, R.S., Spectral analysis of some problems for neutron thermalization, 8:43851 (R;SU;In Russian)
See Polivanov, I.F., 8:43850
Mal'kovskij, A.S., *See* Zaletin, V.M., 8:44617
Malbrecht, D., Experimental studies on drilling with roller bits in a deep-drilling test bench at a rotational speed of 50 min^{-1} to 150 min^{-1}, 8:44391 (R;DE;In German)
Malenfant, R.E., Pajarito Plan for Radiation Emergency. Standard operating procedures, 8:43894 (R;US)
Maleszka, R., *See* Neirinck, L., 8:43464
Malinowski, M.E., Some future directions for metal hydride surface studies: electrons as probes of hydrogen, 8:44255 (J;CH)
Malnes, D., *See* Bendiksen, K., 8:43290
Maloney, T., Modularization of passive solar, 8:43631 (RA;US)
Maly, V., *See* Pinheiro, R.B., 8:43831
Mamedov, I.S., Hydrodynamic characteristics of a horizontal channel on the helium two-phase flow motion, 8:44428 (R;SU;In Russian)
Mancini, T.R., Performance evaluation of a passively heated and cooled solar house, 8:43616 (RA;US)
Maneschy, J.E., Semi-analytical study of the vibrations induced by flow in the piping of nuclear power plants, 8:43774 (R;BR;In Portuguese)
Manesse, D., *See* Duco, J., 8:43881
See Le Grand, J., 8:43880
Maninger, R.C., Issues in radioactive waste management for fusion power, 8:43416 (J;US)
Manley, O.P., *See* Foias, C., 8:44910
Mann, C.A., *See* Gibson, I.H., 8:43896
Mann, G., *See* Ford, A., 8:44044
Mann, J.B., *See* Clark, R.E.H., 8:44898
Manninen, M., *See* Smedskjaer, L.C., 8:44235
Manos, D., *See* Brau, K., 8:45151
Maple, M.B., *See* Majkrzak, C.F., 8:44253
See Woolf, L.D., 8:44249
See Yang, K.N., 8:44242
Marchesin, D., Transients in pipes, 8:44411 (R;BR)
Marciano, W.J., Exact solution of the Dirac equation in the field of a 't Hooft— p Polyakov monopole, 8:44956 (J;US)
Margaritis, A., Use of immobilized cells of Zymomonas mobilis in a novel fluidized bioreactor to produce ethanol, 8:43463 (J;US)
Margetan, F.J., *See* Cambiaggio, M.C., 8:45032
Margolin, L.G., *See* Adams, T.F., 8:43302
Marianowski, L.G., *See* Petri, R., 8:43651
Mark, J.W.K., Recent U.S. target physics related research in heavy-ion inertial fusion, 8:44529 (RA;DE)
Markovskii, D.V., *See* Aleksandrov, V.D., 8:45056
Markowski, G.R., Sulfate aerosols from western low-rank coal-fired boilers with FGD: summary of tests at Coal Creek, Clay Boswell, Milton R. Young, and San Miguel stations. MRI-83-FR-1849, 8:43213 (R;US)
Marklson, M., *See* Reed, T.B., 8:43429
Markvorsen, J.S., Plume rise, 8:44679 (R;DK;In Danish)
Marmouget, J.G., *See* Haas, Philippe, 8:44566
Marolewska, B., *See* Kleczkowski, A.S., 8:44738
Maron, N., *See* Cohen, B.I., 8:45161
Marrett, R., *See* Glaser, H., 8:43189
Marshall, H.A., Exxon catalytic coal gasification process and large pilot plant development program, 8:43154 (RA;US)
Marten, K., Impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle, 8:43808 (R;DE)
Martin, E., *See* Angerer, F., 8:44754
Martin, J.L., Los Alamos National Laboratory computer benchmarking 1982, 8:45303 (R;US)
Martin, M., Passive cooling program overview, 8:43612 (RA;US)
Martin, R.L., *See* Cohen, J.S., 8:44899
Martin, R.M., *See* Thompson, J.D., 8:44221
Martin, W.R., Vectorized Monte Carlo for nonlinear radiation transport, 8:45283 (J;US)
Martinell, R., Vyrmethane. Progress report stage 5. In situ production of methane gas from peat, 8:43182 (R;SE;In Swedish)
Martinez, D.R., *See* Carne, T.G., 8:43721
Martinez, R.J., *See* Mead, K.E., 8:44642
Martini, W.R., Stirling engine design manual. Second edition, 8:44123 (R;US)
Martinis, J.M., *See* Koch, R.H., 8:44398
Martinussen, I., BETAPLOT user' s manual, 8:43275 (R;NO)
Martoff, C.J., Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction, 8:44984 (J;US)

Martynenko, Yu.V., *See* Gusev, V.M., 8:44150
Maruhn, J.A., *See* Buchwald, G., 8:44531
Maschek, I., Studying a hot particle with radiological methods, 8:44703 (RA;DE)
Masek, P., Experiments and model calculations on pyrolysis and gasification of Rhenish lignite in an inclined revolving pipe, 8:43183 (R;DE;In German)
Masek, V., *See* Sulc, V., 8:43814, 8:43815
Maslova, L.V., *See* Ryvkin, S.M., 8:44614
Masuda, M., Dynamic breaking phenomena of structures under electromagnetic field, 8:45267 (RA;JP;In Japanese)
Masuda, S., Bipolar current probe and its application in electrostatic precipitators for diagnosis of back discharge severity, 8:44463 (RA;DE)
Mathews, G.J., *See* Kwiatkowski, K., 8:44989
Mathis, R.A., *See* Christophorou, L.G., 8:44294
Matin, M.A., Comparison of Paris potential results for the zero and continuous particle spectrum, 8:45033 (J;US)
Matkowsky, B.J., *See* Ben-Jacob, E., 8:44394
Matoba, M., *See* Daido, H., 8:45227
Matora, I.M., *See* Zhuravlev, V.V., 8:44539
Matschke, F.E.P., Charge state of hydrogen backscattered from a gold monocrystal, 8:44852 (RA;SU)
Matsuda, K., Fokker-Planck equation for a plasma in a magnetic field with electrostatic fluctuations, 8:45175 (J;US)
Matsui, A., Nuclear energy and its public acceptance in Japan, 8:44020 (R;BE;In French)
Matsui, T., Meson emissions from quark-gluon plasma through formation and fission of chromoelectric flux tubes, 8:44932 (R;US)
Matsunaga, T., Seawater-based hydrogen production by immobilized marine photosynthetic bacteria, 8:43418 (J;US)
Matsunami, N., *See* Swanson, M.L., 8:44147
Mattheis, J.R., *See* Rebeiz, C.A., 8:43526
Matthys, H., *See* Koehler, D., 8:44771
Mattiasson, B., *See* Hahn-Haegerdal, B., 8:43466, 8:43467
Matveev, O.A., *See* Arkad'eva, E.N., 8:44612
See Ryvkin, S.M., 8:44614
Matyukhin, N.M., *See* Zhukov, A.V., 8:43803
Matzen, M.K., *See* Anthes, J.P., 8:44208
Mause, P., *See* Hollaender, W., 8:44705
Maybaum, M.W., Overview of the Passive and Hybrid Solar Energy Program, 8:43549 (RA;US)
Maynard, G., *See* Deutsch, C., 8:44841
Mayr, G., Atmospheric-thermic solar chimneys, 8:43701 (RA;DE;In German)
Mazarskij, V.L., *See* Golovanov, L.B., 8:44387
Mazria, E., Mount Airy Public Library, Mount Airy, North Carolina, 8:43603 (RA;US)
Mazur, J.H., High-resolution electron-microscopy studies of native oxide on silicon, 8:44283 (R;US)
Mazzucato, E., *See* Jobes, F., 8:45148
McBrayer, J.F., Impacts of evaporative cooling towers in arid environments, 8:43737 (J;GB)
McCardell, R.K., *See* Appelhans, A.D., 8:43903
McCaughey, O.J., Southwest Woodbridge Elementary School, 8:43600 (RA;US)
McClain, F.W., *See* Chan, V.S., 8:45179
McClanahan, M.L., *See* Harlow, R.A., 8:43977
McClelland, J.F., Transwall: a modular visually transparent thermal storage wall system, 8:43623 (RA;US)
McClung, R.W., *See* Dodd, C.V., 8:43785
McCollum, B.C., *See* Andrews, L.J., 8:43646
McComas, D.J., *See* Feldman, W.C., 8:44834
McConville, F.X., *See* Miller, J.E., 8:43465
McCormick, S.T., Combinatorial approach to some sparse-matrix problems, 8:45313 (R;US)
McCracken, L.D., Fermentation of cellulose and hemicellulose carbohydrates by thermotolerant yeasts, 8:43459 (J;US)
McDaniel, E.W., *See* Stinton, D.P., 8:43374
McDevitt, P., Consumer-behavorial analysis of alternate-energy adoption: the case of geothermal energy in New Mexico. Final report, 6/1/80-8/1/81, 8:43661 (R;US)
McDonald, J.C., Measurements of gamma-ray dose from a moderated ^{252}Cf source, 8:45059 (R;US)
McElhaney, R.J., *See* Tucker, H.L., 8:44328
McEvoy, A.J., AMOS solar cells on polycrystalline gallium arsenide. Final report, 8:43500 (R;XE)
McGarrah, J.E., *See* Ames, L.L., 8:44819
McGovern, L., Active solar heating and cooling program analysis and reporting. Final technical report, 13 November 1980-31 January 1982, 8:44050 (R;US)
McGowan, T.F., Utilization of waste streams in biomass gasifiers, 8:43431 (RA;US)
McGrory, J.B., *See* Walkiewicz, T.A., 8:45005
McGuigan, D.L., Uses of ORACLE in the Nova Laser Control System, 8:45264 (R;US)
McGuire, K., *See* Brau, K., 8:45151
McKellar, B.H.J., Cosmological bounds on heavy neutrinos through the decays $\nu sub(H) -> 3\nu sub(L)$ and $\nu sub(H) -> \nu sub(L)\gamma$, 8:44946 (J;NL)
See Miller, R.D.C., 8:45082
McMasters, O.D., *See* Shaheen, S.A., 8:44224
McMichael, W.J., *See* Green, D.A., 8:43217
McMillen, D.F., *See* Wood, B.J., 8:43170
McMinn, A., Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8:44179 (RA;US)
McMorran, P.D., *See* Mensah, S., 8:43868
McNair, M.B., Coal distribution, January-March 1983, 8:44035 (R;US)
McNeeley, S.H., PTFE/aramid packing in boiler feedwater pump saves over $2000/year, 8:44105 (J;US)
McNeill, K.G., *See* Pywell, R.E., 8:44993
McNutt, J.D., *See* Nash, J.K., 8:44322
McPartland, S.A., *See* Divine, J.R., 8:43756
McPherson, M.J., *See* Wilson, C.R., 8:44818
McQueen, R.G., Improved system for measuring the writing speed of sweeping image cameras, 8:44457 (J;US)
McVay, G.L., *See* Rai, D., 8:43398
Meacham, T.R., Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981, 8:43873 (R;US)
Mead, K.E., Accelerated aging of Wahl Temp-Plate temperature-recording devices, 8:44642 (R;US)
Meadows, J.W., *See* Gindler, J.E., 8:45024
Mecozzi, D.T., *See* Minton, J.A., 8:45314
Medovar, B.I., *See* Paton, B.E., 8:44239
Medved', V.Ya., *See* Golosaj, N.I., 8:45291
Meggle, R., Description of the 400 kW single-blade wind power plant 'Monopteros', 8:43694 (RA;DE;In German)
Mehta, M.K., Radiation damage studies in fusion reactor materials. Part of a coordinated programme on energetic particle interactions with materials of importance for fusion reactors. Final report for the period 1 February 1977 - 15 December 1980, 8:45225 (R;XA)
Meier, H.E., Objective acoustic quality inspection of complex machines, 8:44120 (R;DE;In German)
Meier, K., *See* Bartel, W., 8:44916
Meikrantz, D.H., *See* Greenwood, R.C., 8:45014
Mel'nichenko, I.A., Laser for holographic track detection in a bubble chamber, 8:44577 (R;SU;In Russian)
Mel'nikov, V.N., *See* Koval', A.G., 8:44144
Mel'nikova, E.V., *See* Arkad'eva, E.N., 8:44612
Melikhov, P.I., *See* Artemenkov, L.I., 8:45224
Melin, P., *See* Puill, A., 8:43762
Mellen, J.B., *See* Schneider, R.F., 8:43349
Melzer, M., *See* Feldt, W., 8:44747
Mendelsohn, M.H., *See* Pellin, M.J., 8:45198
Meng, J., Local networking with intelligent nodes, 8:45304 (R;US)
Mengelkamp, H.T., *See* Fries, S., 8:43684
Mensah, S., Design of multivariable controller for a 600 MWe CANDU nuclear power plant., 8:43868 (R;CA)
Mercer, R., Iowa-project passive: a passive solar house design being built by selected Iowa Community College building trade programs, 8:43586 (RA;US)
Mercer, R.L., *See* Clark, B.C., 8:44996
Merholz, K., Energy utilization in the transport of gardening products, 8:44090 (R;DE;In German)
Merker, Eh.A., *See* Lyudmirskij, Eh.A., 8:44534

Merkle, L.D., Laser-induced bulk damage in SiO_2 at 1.064, 0.532 and 0.355 μm, 8:44265 (RA;US)
Multiple-pulse laser-induced bulk damage in crystalline and fused quartz at 1.064 and 0.532 μm, 8:44264 (RA;US)
Merklin, J.F., *See* King, G.B., 8:44909
Merle, G., *See* Lutz, P., 8:44740
Merrill, T.W., Mennonite Nursing Home passive solar demonstration project, 8:43602 (RA;US)
Merts, A.L., *See* Clark, R.E.H., 8:44898
Mertwoy, H., *See* Woo, K.C., 8:44258
Meservey, E., *See* Jobes, F., 8:45148
See Stevens, J., 8:45152
Meshii, M., Selection of slip systems in low-temperaure deformation of niobium, 8:44128 (R;US)
Mesrelan, G., *See* Baron, J.C., 8:44763
Metayer, Y., Analysis of continuous flow condensation nuclei counters, 8:44669 (RA;DE)
Metcalf, L.A., Preliminary review and summary of the potential for tectonic, seismic, and volcanic activity at the Nevada Test Site defense waste disposal site, 8:43343 (R;US)
Metzger, W., Galvanic dispersion coatings increase the service life of tools used in plastic processing, 8:44236 (TJ;US)
Meuren, K., Development, testing and application of simple solar air heaters for agriculture and industry, 8:43546 (R;DE;In German)
Meyer, A.E., Mitigation of biofouling using coatings - year 3. Quarterly progress report No. 3, 8:44726 (R;US)
Meyer, J., Evaluating of movable thermal screens with regard to the heat consumption of greenhouses, 8:44083 (R;DE;In German)
Meyer, R.A., Collective excitations of ^{82}Kr observed by in-beam and decay spectroscopy and their characterization by the interacting boson model, 8:45001 (J;US)
See Hicks, H.G., 8:45003
Meyer, T.J., *See* Kober, E.M., 8:44334
Meyer-ter-Vehn, J., ICF-target studies of heavy ion fusion, 8:44530 (RA;DE)
Michael, H., *See* Rahn, K.M.M., 8:43769
Michaux, M., Continuous fermentation: improvement of cell immobilization by zeta potential measurement, 8:44784 (J;US)
Michels, T., *See* Wilson, S.J., 8:43564
Michie, D., *See* McDevitt, P., 8:43661
Midden, C.J.H., Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households, 8:44115 (R;NL;In Dutch)
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households. Summary, 8:44116 (R;NL;In Dutch)
The social network approach to increase energy conservation: theoretical backgrounds, 8:44118 (R;NL;In Dutch)
See Ritsema, B.S.M., 8:44117
Migliori, A., *See* Wheatley, J., 8:44436
Mignerey, A.C., *See* Kwiatkowski, K., 8:44989
Mikhael, N.N., Contribution to the dynamic behaviour of steam power plants, 8:43733 (R;DE;In German)
Mikhailov, V.F., Substance ionization by a superheavy monopole, 8:45054 (TG;DE)
Mikhajlov, M.I., *See* Kuznetsov, Yu.K., 8:45252
Mikheev, S.Yu., *See* Gusev, K.I., 8:44845
Mikhnitskij, I.B., *See* Bobyr, V.V., 8:44575
Miklos, J., *See* McDonald, J.C., 8:45059
Miklyaev, V.M., *See* Mamedov, I.S., 8:44428
Milchberg, H., *See* Suckewer, S., 8:44400
Milella, P.P., Fatigue crack growth theory based upon energy consideration, 8:44183 (RA;US)
Miley, G.H., *See* DeVeaux, J.C., 8:45193
See Stark, R.A., 8:45281
Miliaras, E.S., Low-cost peaking capability built into base-load coal-fired power plants, 8:43725 (R;US)
Millar, M., Energy consumption in road transport: data-collection requirements, 8:44088 (R;US)
Millemann, N.T., *See* Olson, R.J., 8:45321
Millener, D.J., *See* Koehler, P.E., 8:44988
Miller, C.W., CHEMTRN user's manual, 8:44744 (R;US)
Miller, G., *See* Ingraham, J.C., 8:45186
Miller, J.A., Additional symbols used in double-spaced text for Wang OIS word-processor users, 8:45316 (R;US)
Miller, J.E., Saccharification and ethanol fermentation of apple pomace, 8:43465 (J;US)
Miller, K.J., *See* Jacobs, S., 8:44952
Miller, M., Massachusetts Local Energy Action Program, 8:43488 (RA;US)
Miller, P.D., *See* Heckel, B., 8:45053
Miller, R.D.C., Anomalous dimension matrices of four quark operators, 8:45082 (R;AU)
Miller, R.H., *See* Sodja, J., 8:44479
Miller, W.G., *See* Macosko, C.W., 8:43270
Milligan, J.D., *See* Ruane, R.J., 8:43211
Milliken, A.N., Development of the independence series bringing passive solar to the real world, 8:43559 (RA;US)
Milne, T.A., Fundamental pyrolysis studies, 8:43434 (RA;US)
Milonni, P.W., Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation, 8:44407 (J;US)
Density and temperature variations in pulsed discharge lasers, 8:44403 (J;US)
Milora, S.L., *See* Hogan, J.T., 8:45257
Milstein, J.B., Review of research on polycrystalline-silicon solar cells, 8:43508 (R;US)
Milutinovic, J., *See* Caswell, W.E., 8:44958
Minck, R.W., *See* Harlow, R.A., 8:43977
Minkowycz, W.J., *See* Chawla, T.C., 8:45279
Minnick, L.J., Development of potential uses for the residue from fluidized-bed-combustion processes. Final report covering results of research program and recommended practices for potential users, 8:44096 (R;US)
Minoo, H., *See* Deutsch, C., 8:44841
Minton, J.A., Syntax and semantics of a LINCS control monologue, 8:45314 (R;US)
Miranda, P.E.V. de, *See* Taroco, E., 8:43857
Mirokhin, I.V., *See* Kuz'min, E.S., 8:44538
See Zrelov, V.P., 8:44542
Mirolyubov, V.P., *See* Glagolev, V.V., 8:44603
Misakian, M., *See* Van Brunt, R.J., 8:45171
Mishonov, T., Acoustic plasma wave in inversion layers and sandwich structures, 8:45107 (R;XA)
Misici, L., *See* de Socio, L.M., 8:44415
Miskioglu, I., *See* Burger, C.P., 8:44418
Mitchell, A.C., *See* Gathers, G.R., 8:44201
Mitchell, J.P., Development of techniques for the preparation of monodisperse solid ferric oxide particles using the May spinning-top aerosol generator, 8:44677 (RA;DE)
Mitchell, J.W., *See* Duffie, J.A., 8:43575
Mitchell, R., Rigid interior thermal window shutter, 8:44065 (RA;US)
Mitchell, R.W., Characterization of β-1,4-glucosidase activity in Thermoanaerobacter ethanolicus, 8:44783 (J;US)
Mitchell, T.E., *See* Liu, H.C., 8:44234
Mitina, N.I., *See* Volkov, Yu.F., 8:45237
Mitrokhin, O.E., *See* Bobyr, V.V., 8:44575
Mitroy, J., *See* Frost, L., 8:44839
Mitsui, A., *See* Matsunaga, T., 8:43418
Miyahara, A., Heavy ion ICF study from the view of energy costs, 8:45217 (RA;DE)
Miyamoto, S., *See* Ozaki, T., 8:45110
Miyauchi, Y., *See* Takatsu, H., 8:45266
Mlekodaj, R.L., Decay of mass-separated ^{156}Yb, 8:45013 (J;US)
Mnich, T.M., Comparison of analytical models and experimental results for single-event upset in CMOS SRAMs, 8:44628 (R;US)
See Kim, W.S., 8:44393
Moberg, P.O., *See* Liem, H., 8:43201
Mochizuki, T., *See* Sakabe, S., 8:45228
Modarres, M., *See* Curry, J.J., 8:43757
Modine, F.A., *See* Jellison, G.E. Jr., 8:44292
Moehlecke, S., *See* Cort, B., 8:44222
Moeller, B., Biological monitoring of thermal effects of cooling water discharges from Danish power plants, 8:44804 (RA;DK)
Moeller, C., 60 GHz ECH on Doublet III: 40 kW phase, 8:45203 (RA;US)
Moeller, H., Testing of the antiwear properties of synthetic engine oils by the use of radionuclide technique, 8:44608 (R;DE;In German)
Moeller, M.P., The sensitivity of calculated doses to critical assumptions for the offsite consequences of nuclear power reactor accidents, 8:43964 (BA;US)
Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation, 8:43948 (R;US)
Mogharrebi, M., In-situ behaviour of salt from closure of deep boreholes, 8:44823 (BA;CA)
Mohammadioun, B., *See* Levret, A., 8:43875
Mohapatra, R.N., Higgs-boson effects in grand unified theories, 8:44944 (J;US)

Mojsenz, P.V., *See* Govorun, N.N., 8:45297
See Ivanchenko, Z.M., 8:45296
Mokhov, N.V., *See* Borodin, V.E., 8:44573
Molly, J.P., Development, construction and operation of a 30/100 kW wind power plant built in German-Brasilian cooperation, 8:43703 (RA;DE;In German)
Molvig, K., *See* Berk, H.L., 8:45172
Mondy, L.A., Hydrology of sealing a repository in saturated tuff, 8:43386 (R;US)
Monnier, A., *See* Baur, A., 8:43758
Montag, A., *See* Luckas, B., 8:44741
Montagne, M., Corrosion and the corrosion inhibition effects in the BUGEY 1 reactor, 8:43789 (R;FR;In French)
Monteiro, Edson, *See* Taroco, E., 8:43857
Montierth, L., Rayleigh-Taylor instability and resulting failure modes of ablatively imploded inertial-fusion targets, 8:45261 (R;US)
Mook, H.A., *See* Yang, K.N., 8:44242
Moon, D.M., *See* Bamford, W.H., 8:43779
Moore, C.F., *See* Greene, S.J., 8:44980
Moore, D.S., Single-pulse coherent Raman spectroscopy in shock-compressed benzene, 8:44327 (R;US)
See Quick, C.R. Jr., 8:44883
Moore, F., Analysis of performance of passive solar heated nature center, 8:43583 (RA;US)
Morari, M., Integrated plant control: a solution at hand or a research topic for the next decade, 8:44373 (B;US)
Moravcsik, M.J., *See* Kusno, D., 8:44970
Morawietz, G., *See* Hollaender, W., 8:44705
More, R.M., *See* Bailey, D., 8:44842
Moreira, A.R., Utilization of the fermentor off-gases from an acetone-butanol fermentation, 8:43470 (J;US)
Moreira, M.J., *See* Dale, B.E., 8:43516
Morfin, J.G., Survey of nu/sub μ/e physics with emphasis on recent Fermilab results, 8:44921 (R;US)
Morgan, D.L. Jr., Simulations and parameter-variation studies of heavy-gas dispersion using the SLAB model, 8:44693 (R;US)
Morgan, D.T., Chlorine-extraction processes for energy-conserving recovery of nonferrous metals, 8:44104 (R;US)
Morgan, G., Monitoring environmental quality, 8:43998 (RA;US)
See Mazria, E., 8:43603
Morgan, L.G., *See* Bray, L.A., 8:43375
Moriarty, K.J.M., *See* Ardill, R.W.B., 8:44954
Morkel, H.R., Application of technetium-99m-phosphate isomers in nuclear medicine. A comparative study, 8:44779 (B;ZA;In Afrikaans)
Moro, N., *See* Blass, A., 8:44381
Morokhov, P.V., *See* Gornov, M.G., 8:44594
Morokhovets, M.A., *See* Gornov, M.G., 8:44589
Morozov, N.P., *See* Pavlov, P.V., 8:44272
Morris, C.L., High resolution studies of pion-nucleus reaction mechanism, 8:44975 (R;US)
See Greene, S.J., 8:44980
Morris, E.E., *See* Komoriya, H., 8:43960
Morris, F.A., Institutional implications of establishing safety goals for nuclear power plants, 8:43940 (R;US)
Morris, L.K., *See* Morgan, D.L. Jr., 8:44693
Morris, W., *See* Bensinger, J., 8:44925
Morrison, G.C., *See* Geesaman, D.F., 8:44985
Morse, F.H., New directions in the US solar heating and cooling program, 8:43482 (RA;US)
Morse, R., *See* Montierth, L., 8:45261
Morss, L.R., Enthalpies of formation of strontium dichloride and of the strontium ion (Sr^{2+}) in water and in 1 $mol.dm^{-3}$ HCl, and an assessment of enthalpies of formation of alkaline-earth dichlorides, 8:44338 (J;GB)
Mortensen, L., Fly ash production, utilization and disposal, 8:43205 (RA;DK)
Mosby, W.R., *See* Dooley, W.T., 8:43906
Moseev, A.I., *See* Glebov, A.P., 8:43839
Moser, R., *See* Clements, L.D., 8:43430
Moser, S.B., *See* Garvey, D.B., 8:44658
Moses, G.A., *See* Kessler, G., 8:45216
Moses, J.M., *See* de Filippi, R.P., 8:43468
Moshier, W.C., *See* Ballinger, R.G., 8:44177
Moss, J.M., *See* Baker, F.T., 8:45009
Moss, R.W., *See* Patten, J.W., 8:44194
Mostrom, M.A., Shear-driven instabilities of annular relativistic electron beams in vacuum, 8:44888 (J;US)
Motavekh, Kh.A., *See* Bukhanov, V.M., 8:44866
Mothes, H., Investigation to the separation efficiency of a cyclone separator using a stray light particle size counting technique, 8:44672 (RA;DE;In German)
Motley, R., *See* Jobes, F., 8:45148
See Stevens, J., 8:45152
Mott, R.E., Winfrith PVT Package, 8:43291 (R;GB)
Mougin, B., *See* Rocchia, R., 8:44563
Movchan, S.A., *See* Abdushukurov, D.A., 8:44591
Mozurkewich, M., Optimization of a heat engine based on a dissipative system, 8:45083 (J;US)
Mueller, C.J., *See* Komoriya, H., 8:43960
Mueller, H., Corrective switching, 8:43740 (R;DE;In German)
Mueller, J., *See* Klein, H., 8:44522
Mueller, M., *See* Argyris, J.H., 8:43695
Mueller, R., *See* Demuth, H., 8:43188
Mueller, R.W., Remark on coupled motion and equipartitioning, 8:44487 (RA;DE)
Use of a heavy-ion synchrotron facility for ICF studies, 8:44474 (RA;DE)
Muetterties, E.L., *See* Gentle, T.M., 8:44339
Mukamel, D., *See* Grinstein, G., 8:45077
Mukashev, K.M., *See* Dekhtyar, I.Ya., 8:44165
Mukhin, P.A., *See* Artemenkov, L.I., 8:45224
Mulcahy, T.M., Leakage-flow-induced vibration of a tube-in-tube slip joint, 8:43799 (R;US)
Review of leakage-flow-induced vibrations of reactor components, 8:43798 (R;US)
Mulder, R.W.A.W., Salmonella radicidation of poultry carcasses, 8:44793 (R;NL)
Mulders, P.J., Phenomenological surface inertia in the MIT bag model, 8:44936 (J;US)
Mulloney, J.A., Environmental characterization of corn-based fuel ethanol plants, 8:43455 (BA;US)
Muralev, V.A., Dechanneling function for relativistic axially channeled electrons, 8:45044 (RA;SU;In Russian)
Muralidhara, H.S., *See* Hillman, M., 8:43451
Muranov, Yu.V., *See* Kashcheev, V.M., 8:43863
Murcia, N., *See* Ismail, K.A.R., 8:44382
Murphy, G.J., *See* Andrews, L.J., 8:43646
Murphy, M.B., *See* Gerstein, R.E., 8:43659
Murray, G.E., Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8:44008 (R;US)
Murray, W., Photovoltaic status assessment: industry perspective, 8:43532 (RA;US)
Murthy, B., *See* Jones, G.E. Jr., 8:43175
Muser, D., Blade technology programme for large wind power stations, 8:43699 (RA;DE;In German)
Musset, P., Beauty experiments at the SPS, 8:44914 (R;CH)
Mutharasan, R., *See* Whitcraft, D.R., 8:43444
Muzinich, I.J., *See* Keung, W., 8:44942
See Marciano, W.J., 8:44956
Myra, J.R., Radial transport, end loss, and ambipolarity in tandem mirrors, 8:45159 (J;US)
See Catto, P.J., 8:45191
Myrick, T., *See* Wethington, J.A., 8:43394

N

Nadirashvili, L.Sh., *See* Tsetskhladze, T.V., 8:44278
Naftulin, S.M., Electromagnetic processes in a resonance invertor of a feedback system, 8:45222 (R;SU;In Russian)
Nagel, G., *See* Feldt, W., 8:44747
Nail, T., *See* Maier, K.H., 8:45017
Nair, R.K., UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems, 8:45057 (TG;US)
Nair, R.P.K., *See* Barroso, D.E.G., 8:43775
Najafpour, G., *See* Clausen, E.C., 8:43518
Nakai, S., *See* Daido, H., 8:45227
See Ozaki, T., 8:45110
Nakajima, H., *See* Kondo, T., 8:43754
See Shoji, T., 8:43859
Nakajima, K., *See* Miyahara, A., 8:45217
Nakamoto, K., *See* Schrader, D.M., 8:44317
Nakamura, H., *See* Takatsu, H., 8:45266
Nakanishi, T., INS RFQ linac 'LITL', 8:44470 (RA;DE)
Nakano, Y., Assessment of fracture toughness of heavy-section steels for nuclear pressure vessels, 8:43861 (TJ;US)
Nakles, D.V., Impact of process design on effluent control technology needs in coal gasification, 8:43235 (RA;US)

Nakos, J.T., Error analysis of thermocouple measurements in the Climatic Facility, 8:44643 (R;US)
Nall, D.H., Passive solar mobile home project, 8:43560 (RA;US)
Narain, R., Use of thermal time constant concept in the analysis of reactivity induced accidents with feedback, 8:43914 (RA;BR)
Naroska, B., *See* Bartel, W., 8:44916
Nash, J.K., Positron annihilation in a homologous series of liquid crystals, 8:44322 (BA;NL)
Nastasi, M.J.C., *See* Fulfaro, R., 8:43890
Nath, R., *See* Rosenthal, M.S., 8:44778
Natkaniec, I., *See* Baluka, G., 8:44595
Navoda, L.P., *See* Nakos, J.T., 8:44643
Navok, T., *See* Shinar, E., 8:44758
Nawrot, A., *See* Zhidkov, N.K., 8:44586
Nealey, S.M., Nuclear power attitude trends, 8:43949 (R;US)
Nechvatal, I., *See* Sulc, V., 8:43814, 8:43815
Nedelik, A., Control of the ASTRA decay heat removal system, 8:43895 (R;AT;In German)
Neeper, D.A., LASL passive program, 8:43570 (RA;US)
Nefed'eva, L.S., Operation with files in the mode of sequential access in the system of spectra processing, 8:45299 (R;SU;In Russian)
Neirinck, L., Alcohol production from sugar mixtures by Pachysolen tannophilus, 8:43464 (J;US)
Nejmark, K.N., *See* Gornov, M.G., 8:44589
Neklyudov, I.M., Relation between the conditions of helium ion implantation and helium void equilibrium parameters, 8:44279 (RA;SU;In Russian)
See Zhelenskij, V.F., 8:44162
Nelson, B.E., *See* Johnson, R.L., 8:45199
Nelson, C.H., *See* Shen, S.Y., 8:43514
Nelson, G.W., *See* Kondepudi, D.K., 8:45087
Nelson, M.A., *See* Allison, S.W., 8:44639
Nelson, P.H., Water inflow into boreholes during the Stripa heater experiments, 8:43362 (R;US)
Nemanich, R.J., *See* Jackson, W.B., 8:44302
Nemashkalo, B.A., Pair gamma-spectrometer, 8:44326 (R;SU;In Russian)
Nemethy, P., Muon-decay neutrinos and limits on neutrino oscillations, 8:44948 (BA;US)
Nern, C.F., *See* Levin, G.B., 8:43351
Netushilova, Z., *See* Abdushukurov, D.A., 8:44591
Neuberger, H., *See* Adler, S.L., 8:44955
Neumann, W., *See* Klein, H., 8:44522
Nevins, W.M., *See* Cohen, B.I., 8:45161
Nevskaya, N.A., *See* Evdokimov, N.N., 8:44541
Nevyjel, A., Use of 'Direct File Organization' for 'Current Awareness'-Services, 8:45322 (R;AT;In German)
Newell, G.A., *See* Byrns, R.A., 8:45274
Niarchos, D., *See* Dunlap, B.D., 8:44256
See Noakes, D.R., 8:44309
Nichinskij, N.A., *See* Brazulev, D.P., 8:44535
Nichols, B.D., *See* Adams, T.F., 8:43302
Nichols, S., *See* Nichols, W., 8:43624
Nichols, W., Residential passive solar development and marketing, 8:43624 (RA;US)
Nicholson, N., Real-time inventory system for special nuclear material in storage, 8:43406 (R;US)
Nicolau, V.deP., Mathematical model for the calculation of internal turbulent flow, 8:44906 (R;BR;In Portuguese)
Nielsen, M.H., *See* Bundgaard, J., 8:44640
Nielsen, O.J., Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air, 8:44688 (R;DK)
Nielsen, T., *See* Nielsen, O.J., 8:44688
Nielson, R.M., Thermal cycling and vibration response for PREPP concrete waste forms, 8:43354 (R;US)
Niessner, R., Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling, 8:44675 (RA;DE)
New approach to the determination of atmospheric strong acids, 8:44670 (RA;DE)
Nikitin, S.G., *See* Berezhnoj, V.A., 8:44570
See Gumenyuk, S.A., 8:44572
Nikityuk, N.M., Problems of optimal data coding in hodoscopic systems, 8:44606 (R;SU;In Russian)
Nilan, R.A., *See* Constantin, M.J., 8:44809
Nilsson, L.Y., Hydrological environmental consequences of peat extraction. Preliminary study, 8:43242 (R;SE;In Swedish)
Nimal, B., *See* Duchemin, B., 8:43837
Nimal, J.C., *See* Baur, A., 8:43758
See Duchemin, B., 8:43837
Nishiguchi, A., Finite size fluid particle in nonuniform moving grid, 8:45111 (R;JP)
Nissen, D.A., Apparatus for the precise measurement of the physical properties of liquids at elevated temperature and pressure, 8:44647 (J;US)
Niven, M.L., Isotopic labelling applied to the infrared spectra of metal complexes, 8:44345 (B;ZA)
Nix, J.R., *See* Hofmann, H., 8:45036
Niziol, B., *See* Drozdowicz, B., 8:44656
Noakes, D.R., Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/ sup /, 8:44309 (J;US)
Nobes, M.J., *See* Tanovic, L.A., 8:44142
Noda, A., *See* Katayama, T., 8:44559
Nogar, N.S., *See* Jalenak, W.A., 8:44885
Noll, S.A., Passive solar economic and market analysis, 8:43479 (RA;US)
Norco, J.E., *See* Croke, E.J., 8:44002
Nordell, B., *See* Johansson, B., 8:43975
Norman, M.L., *See* Smith, M.D., 8:44832
Norris, C.B., Defect reactions and effects of coimplants and prior heat treatment in pulsed laser annealing of ion-implanted CdTe:In and CdTe:Cl, 8:44314 (J;GB)
Northrup, C.J., *See* Dosch, R.G., 8:43384
Northrup, J.E., Atomic geometry and surface-state spectrum for Ge(111)-(2 x 1), 8:44214 (J;US)
Norton, W.W., Coal gasification at Caterpillar's York, Pennsylvania, plant, 8:43180 (RA;US)
Novakov, T., *See* Rosen, H., 8:45084
Novikov, D.L., *See* Glazov, A.A., 8:44494
See Zaplatin, N.L., 8:44477
Novikov, V.M., *See* Aleksandrov, V.D., 8:45056
Nozhkina, I.N., *See* Golenetskij, S.P., 8:44613
See Zaletin, V.M., 8:44617
Nuland, S., *See* Bendiksen, K., 8:43290

O

O'Brien, H.A. Jr., *See* Grant, P.M., 8:44366
O'Connor, D.J., *See* MacDonald, R.J., 8:44850
O'Hara, F.A., Nuclear-fuel-cycle education: Module 8. Waste management, 8:43345 (R;US)
Nuclear-fuel-cycle education: Module 9. Safeguards, 8:43402 (R;US)
Oakes, K.M., *See* McBrayer, J.F., 8:43737
Obayashi, H., Ion-beam-driven inertial confinement fusion. An overview, 8:45238 (RA;JP)
Obermair, G.M., Simultaneous wind speed measurements in different altitudes with high time resolution for the specification of large wind energy converters, 8:43673 (RA;DE;In Germany)
Obnorskij, V.V., *See* Baranov, I.A., 8:44876
Obukhov, Yu.L., *See* Kuz'min, E.S., 8:44538
Obukhov, Yu.V., *See* Komlev, V.P., 8:44576
Ochoa, A. Jr., SNAP-BACK: a stable regenerative breakdown mode of MOS devices, 8:44627 (R;US)
Odeurs, J., *See* Reinstema, S.R., 8:44149
Odoni, W., *See* Woolf, L.D., 8:44249
Oechsner, H., Comparative studies of the energy distribution of neutral atoms sputtered from a NiW-alloy and from elemental Ni and W by 2.5 keV Ar^+ ions, 8:44848 (RA;SU)
Oei, H.Y., Copper plating of iron and steel wires by cementation, 8:44240 (TJ;US)
Oen, O.S., Some analytical solutions to the two atom blocking model, 8:44858 (RA;SU)
Oerjasaeter, O., Denpendency models and probability of joint events, 8:44444 (R;NO)
Suggestions concerning the use of failure data, 8:44445 (R;NO)
Oery, H., *See* Greff, E., 8:43700
Ofengenden, R.G., *See* Golovach, L.A., 8:45301, 8:45302
Ogard, A.E., Research and development related to the Nevada Nuclear Waste Storage Investigations. Progress report, October 1-December 31, 1982, 8:43359 (R;US)
Ogisu, Y., Coal liquefaction technology development in NEDO, 8:43156 (RA;US)
Ogura, K., *See* Daido, H., 8:45226
Ohashi, N., *See* Nakano, Y., 8:43861
Ohkubo, Y., Excitation functions of the $^{127}I(\pi,\pi xn)$ reactions in the region of the (3,3) resonance, 8:45007 (J;US)

Ohlsson, H., Common data base experiment: revised event bulletin, 8:44653 (R;SE)
Olander, L., Agglomeration of welding smoke: a comparison between experiments and theoretical calculation of welding-smoke agglomeration speed, 8:44695 (TG;US)
Olejnik, E.E., *See* Bykov, V.I., 8:44551
Olejnikov, L.N., *See* Golovach, L.A., 8:45302
Olem, H., *See* Ruane, R.J., 8:43211
Oliveira, C.R.E., Neutronic calculation of the next fuel elements for the Argonaut reactor, 8:43889 (RA;BR;In Portuguese)
Oliveira, L.F., *See* Freire, C.F., 8:43918
Olschowy, G., *See* Angerer, F., 8:44754
Olsen, C.R., *See* Cutshall, N.H., 8:44719
Olsen, J.M., *See* Berger, C., 8:44915
Olson, C.G., *See* Leveque, G., 8:44219
Olson, D.G., Gamma intensities for ^{226}Ra and daughters, and ^{235}U, 8:45027 (J;NL)
Olson, J.S., Carbon in live vegetation of major world ecosystems, 8:44710 (R;US)
Olson, R.J., Proceedings of the 1982 integrated data users workshop, 8:45321 (R;US)
Olson, S., *See* Sidman, S., 8:44620
Olsson, B., *See* Hultberg, H. Grennfelt, P., 8:44735
Olsson, M.G., *See* Jacobs, S., 8:44952
Olsson, N., Neutron elastic scattering in the energy region 1.5 to 4.0 MeV for radiogenic lead and bismuth, 8:45015 (R;SE)
Ondrey, G., *See* Das, P., 8:44882
Ondrey, G.S., *See* Brewer, P., 8:44881
Ong, E.T., *See* Petri, R., 8:43651
Onischak, M., Support research for biomass thermal-gasification development, 8:43422 (R;US)
See Kosowski, G.M., 8:43428
Onishchenko, L.M., *See* Glazov, A.A., 8:44494
Ono, I., Electrochemical behavior of a pyrophosphate-borohydride electroless nickel plating bath, 8:44237 (TJ;US)
Ono, M., *See* Wong, K.L., 8:45150
Onusic, J. Jr., *See* Praes, J.G.L., 8:43916
Opekunov, V.N., Investigation of the initial stages of surface erosion of solids under ion bombardment by the vacuum decoration method, 8:44267 (RA;SU;In Russian)
Oravec, J., *See* Holy, K., 8:44574
Orazem, M.E., Mathematical modeling and optimization of liquid-junction photovoltaic cells, 8:43501 (R;US)
Orphan, R.C., *See* Knox, J.B., 8:44691
Orr, F.E., Assessment of potential wood supply for intermediate scale thermoconversion facilities, 8:43507 (RA;US)
Orr, F.M. Jr., Displacement of oil by carbon dioxide. Annual report, October 1981-September 1982, 8:43276 (R;US)
Orth, C.J., *See* Ohkubo, Y., 8:45007
Ortykov, A., Electron emission from metal-film systems under atomic particle bombardment, 8:44871 (RA;SU;In Russian)
Osbourn, G.C., In/sub x/Ga/sub 1-x/As-In/sub y/Ga/sub 1-y/As strained-layer superlattices: A proposal for useful, new electronic materials, 8:44259 (J;US)
See Wiczer, J.J., 8:44315
Osenbach, J.W., Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel, 8:44262 (R;US)
Oshis, F., *See* Osipov, L., 8:43528
Osipenko, B.P., *See* Gornov, M.G., 8:44589, 8:44594
See Zhargal, Ch., 8:44596
Osipov, L., Production of lactic acid by high-speed fermentation method, 8:43528 (TJ;US)
Oskarsson, A., *See* Herrstroem, N.-Y., 8:44976
See Jakobsson, B., 8:45000
Ososkov, G.A., Comparative characteristics of program simulators of SHP and HDR special processors for on-line data processing, 8:44604 (R;SU;In Russian)
Oster, H, *See* Preuss, O., 8:44805
Ostmeyer, R.M., *See* Strip, D.R., 8:43961
Ott, E., *See* Grebogi, C., 8:45094
Ott, H.R., *See* Woolf, L.D., 8:44249
Otterlund, I., *See* Herrstroem, N.-Y., 8:44976
Ottinger, P.F., *See* Tripathi, V.K., 8:44887
Ottlinger, M.E., *See* Chuang, S.Y., 8:44320
Outlaw, D.A., *See* Raman, S., 8:44994
Over, J.A., Risks of energy systems, 8:44007 (R;NL;In Dutch)
Ovsyannikov, V.A., *See* Babalin, A.I., 8:45231
Owen, E.W., Alternative connections for the large MFTF-B solenoids, 8:45260 (R;US)
Owens, E.T., *See* Constantin, M.J., 8:44808
Oyama, H., *See* Sakamoto, Y., 8:45251
Ozaki, T., Characteristics of transported ion beam in laser-initiated plasma channels, 8:45110 (R;JP)
Ozolins, G., *See* Morgan, G., 8:43998

P

Paar, V., *See* Hicks, H.G., 8:45003
Pabst, M., Beam dynamics in the HIBALL linear accelerators, 8:44485 (RA;DE)
Paciotti, M.A., *See* Jones, S.E., 8:45215
Pacyna, J., Spatial distribution of the trace element emission from conventional thermal power plants in Europe, 8:44682 (R;NO)
Pacyna, J.M., Determination of human exposure using measured data of Cd, As and Pb, 8:43241 (R;NO)
Paes-Leme, P.J.S., *See* Marchesin, D., 8:44411
Paetsch, L., *See* Baker, B., 8:44055
Pagni, P.J., *See* Beier, R.A., 8:44370
Pagsberg, P., *See* Nielsen, O.J., 8:44688
Paisley, M.A., *See* Feldmann, H.F., 8:43427
Pakvasa, S., *See* McKellar, B.H.J., 8:44946
Pal'chik, V.V., *See* Govorun, N.N., 8:45297
Palfalvi, J., *See* Szabo, P.P., 8:44609
Palmer, H.E., Neutron-activation analysis in vivo, 8:44776 (R;US)
Palmer, R.B., *See* Baggett, N., 8:44561
Palombo, F., *See* Zajmidoroga, O.A., 8:44581
Panian, T.F., Analysis of the annual temperature wave propagating through an alluvial soil, 8:44720 (R;US)
Pankratov, I.M., *See* Klima, R., 8:45118
Panov, D.A., *See* Arsenin, V.V., 8:45106
Papatheodorou, G.N., *See* Child, W.C. Jr., 8:44340
Pape, E., *See* Hollaender, W., 8:44705
Papkov, L.N., *See* Artemenkov, L.I., 8:45224
Paquot, M., *See* Michaux, M., 8:44784
Parafilo, L.M., Program for computation of transition processes in the tube bundle of a steam generator module (DINAMO-2), 8:43765 (R;SU;In Russian)
Parchen, L.J., *See* Ruescher, G.E., 8:43937
Parish, B., *See* MacDonald, R.J., 8:44850
Park, G.L., *See* Schlueter, R.A., 8:43722
Park, W., Nonlinear saturation of nonresonant internal instabilities in a straight spheromak, 8:45163 (J;US)
Parker, J.H., Ocean disposal and construction with stabilized coal waste blocks, 8:43196 (RA;DK)
See Donnelly, J.R., 8:43197
Parmentier, N., *See* Le Grand, J., 8:43880
Parmentola, J.A., Static-bag-source meson field theory: Strong-coupling approximation, 8:44935 (J;US)
Parrinello, M., Structural transitions in superionic conductors, 8:45076 (J;US)
Study of an F center in molten KCl, 8:44358 (R;US)
Parry, R.F., *See* Wouters, J.M., 8:45006
Parsons, B.K., Performance prediction of attached sunspaces, 8:43645 (R;US)
Parsons, W.M., Design and testing of a prototype water-cooled vacuum interrupter for use in superconducting-magnet protection circuits, 8:45253 (R;US)
Partridge, L.J., Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8:43228 (RA;US)
Paschmann, G., *See* Feldman, W.C., 8:44834
Pascual, R., *See* Taroco, E., 8:43857
Pashchenko, A.B., *See* Bychkov, V.M., 8:44995
Pashnev, V.K., *See* Kuznetsov, Yu.K., 8:45252
Patel, P., *See* Baker, B., 8:44055
Patlan', Yu.V., *See* Golovach, L.A., 8:45301
Patocka, I., *See* Glagolev, V.V., 8:44599
Paton, B.E., Electro-slag casting of steel, 8:44239 (TJ;US)
Patrascioiu, A., Improved semiclassical approximation, 8:45085 (J;US)
Patten, J.W., Effects of O_2 addition on the growth of columnar shadowing defects in sputtered Ni, 8:44194 (R;US)
Pattengill, M.G., Incinerated waste consolidation studies, 8:43350 (R;US)
Patterson, M.G., Total energy requirements of food retailing, 8:44047 (R;NZ)
Total energy requirements of shopping for food, 8:44048 (R;NZ)
Patton, J.T., CO_2 formation damage study. Final report, 8:43273 (R;US)

Pattyn, H., *See* Reinstema, S.R., 8:44149
Paul, M., *See* Ernst, H., 8:45010
Pauls, H.M., *See* Konuk, A.A., 8:44416
Pavlo, P., *See* Klima, R., 8:45118
See Krlin, L., 8:45248
Pavlov, P.V., Effect of stationary force fields on the concentration and distribution of radiation damages in atom collision cascades, 8:44272 (RA;SU;In Russian)
Payne, M.G., Two-state models of radiative collisions and related ionization effects, 8:44904 (J;US)
Peake, C.V., *See* Hill, F.E., 8:43248
Pearson, C.F., Changes in compressional and shear wave velocities and dynamic moduli during operation of a hot dry rock geothermal system, 8:43655 (J;US)
Pecherskij, O.P., Electric strength and probability of breakdown of high-voltage insulation of nanosecond accelerators, 8:44478 (R;SU;In Russian)
Peek, J.M., Subshell formula for the Bethe-Born stopping approximation, 8:45050 (J;US)
Peercy, P.S., *See* Norris, C.B., 8:44314
Pegrum, C.M., *See* Koch, R.H., 8:44398
Pelizzone, M., *See* Vining, C.B., 8:44310
Pell, M., Rapidly expanding US market for industrial scale fluidized bed combustion, 8:43258 (RA;US)
Pellin, M.J., Effect of oxygen monolayer coverages on titanium sputtering yields as determined by simultaneous laser fluorescence and auger measurements, 8:45198 (R;US)
Pellish, D.M., Overview of residential buildings program, 8:43550 (RA;US)
Pelloux, R.M.N., *See* Ballinger, R.G., 8:44177
Pelroy, R.A., *See* Sklarew, D.S., 8:44687
Penfold, J., High resolution energy analysers for the 'High Throughput Inelastic Spectrometer', 8:44622 (R;GB)
Peng, T.H., Invasion of fossil-fuel CO_2 into the ocean, 8:44729 (R;US)
Peng, Y.K.M., FED-A, an advanced performance FED based on low safety factor and current drive, 8:45256 (R;US)
Penteurieder, J., *See* Biasin, K., 8:44101
Penumetcha, V., *See* Baker, F.T., 8:45009
Percival, C.M., Subseabed Disposal Program In-Situ Heat Transfer Experiment (ISHTE), 8:43380 (R;US)
Percival, W.H., Biomass fueled Stirling engine combustor research, 8:43473 (RA;US)
Percus, J.K., *See* Percus, O.E., 8:45319
Percus, O.E., Phase transition in a four-dimensional random walk with application to medical statistics, 8:45319 (J;US)
Perdan, A., *See* Trkov, A., 8:43842
Pereira, L.C., Use of the strength ratio for pre-cracked Charpy specimens for the measuring, of the dynamic toughness of steels, 8:44140 (R;BR;In Portuguese)
Perel'shtejn, Eh.A., *See* Beloshitskij, P.F., 8:44499
Pereverzev, G.V., *See* Stoeckel, J., 8:45122
Perfeev, V.N., *See* Zabolotin, V.P., 8:44495
Perkins, M.C., *See* Burris, A.E., 8:43981
Perkins, R.W., *See* Toste, A.P., 8:43396
Perrin, M.L., Plutonium aerosols size distribution in a reprocessing plant, 8:44700 (RA;DE)
See Metayer, Y., 8:44669
Perrot, F., *See* Kahn, L.M., 8:44220
Perrotta, J.A., *See* Fernandes, V.B., 8:43776
Pershing, D.W., *See* Chen, S.L., 8:43264
Persson, F., Reduction of organic matter in macroporous weak anion exchanger and scavenger filter. Field studies, 8:44745 (R;SE;In Swedish)
Persson, P.-G., *See* Bjelm, L., 8:43657
Pervushov, V.V., *See* Glagolev, V.V., 8:44599, 8:44603
Peshekhonov, V.D., *See* Abdushukurov, D.A., 8:44591
Pesnell, W.D., *See* Starrfield, S.G., 8:44828
Peters, U., *See* Juentgen, H., 8:43240
Petersen, A., *See* Elsen, E., 8:44917, 8:44918
Petersen, G., *See* Fries, S., 8:43684
Peterson, C., *See* Carlson, C.E., 8:44943
Peterson, E.J., Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8:43306 (R;US)
Peterson, J.M., Closed orbit produced by an imperfect bump, 8:44501 (R;US)
Peterson, K.I., Photoionization studies of Na_2Cl and Na_2O and reactions of metal clusters, 8:44884 (J;US)
Petri, R., New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report, 8:43651 (R;US)
Petrov, A.A., *See* Dorozhkin, A.A., 8:44870
Petrov, N.N., *See* Dorozhkin, A.A., 8:44870
Petrov, V.A., *See* Dolbilov, G.V., 8:44476, 8:44476
Petrovykh, Yu.L., *See* Gumenyuk, S.A., 8:44572
Petrzilka, V.A., *See* Klima, R., 8:45118
Petushkova, N.A., *See* Glushkov, E.S., 8:43841
Peyrer, H., *See* Langhoff, J. Schaefer, W., 8:43152
Pfister, P.J., Pfister residence - results of a passive retrofit in a cold climate, 8:43580 (RA;US)
Philipp, A., Investigation of real niobium surfaces by rf-measurements between 12 and 18GHz, 8:44389 (R;DE;In German)
Phillips, S.L., Monitoring equipment. II. Survey of water monitoring instrumentation, 8:44728 (RA;US)
Phlippen, P.W., Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors, 8:43791 (R;DE;In German)
Piasetzky, E., *See* Altman, A., 8:44981
Pichugin, A.P., *See* Gornov, M.G., 8:44594
Pickering, S., Characterization of nuclear fuel aerosol by sedimentation, 8:44702 (RA;DE)
Picmaus, E., Development and testing of a submersible motor pump driven by a solar cell generator, 8:43490 (R;DE;In German)
Picraux, S.T., *See* Campisano, S.U., 8:44148
Piepers, G.G., *See* de Boer, A.A., 8:43668
Pifer, A.E., *See* Kalbach, R.M., 8:44923
Piffl, V., Soft X-ray and VUV emission from REB-heated plasma in Rebex 1 and Rebex 2 machines, 8:45126 (RA;CS)
Pikel'ner, L.B., *See* Borzakov, S.B., 8:44592
Pimenov, V.V., Fast neutron fluxes and spectra in the RBT-6 reactor channels, 8:43892 (R;SU;In Russian)
Pina, L., Ion velocity measurements for laser mass ablation studies, 8:45245 (RA;CS)
Pinard-Legry, G., Intergranular attack of Alloy 600: high-temperature electrochemical tests. Final report, 8:44137 (R;FR)
Pindzola, M.S., Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory, 8:44890 (J;US)
Pinheiro, R.B., KFA/NUCLEBRAS R + D program on Th utilization in PWR, 8:43831 (R;BR)
Pinkel, D., Cytometric analysis of mammalian sperm for induced morphologic and DNA content errors, 8:44801 (R;US)
Pinos, I.B., Automatization of ultrahigh frequency measurement methods of characteristics of pulsed plasma processes on-line with the M-7000 computer, 8:45145 (R;SU;In Russian)
Pippin, C.G., *See* Ensor, D.D., 8:44330
Pirkle, D.R., *See* Conrad, J.R., 8:45276
Pisarev, A.A., *See* Tel'kovskij, V.G., 8:44153
Place, W., *See* Kammerud, R., 8:43601
Placer, F., *See* Guillory, J., 8:43212
Plante, G., *See* Pinard-Legry, G., 8:44137
Plastino, A., *See* Cambiaggio, M.C., 8:45032
Plato, P., *See* McDonald, J.C., 8:45059
Platts, N., *See* Saum, C.J., 8:43364
Ploeger, G., *See* Hocke, K.D., 8:43911
Plogmann, H., *See* Kuehn, L., 8:43190
Plyaskin, V.I., *See* Bychkov, V.M., 8:44995
Pocha, M.D., Avalanche devices state-of-the-art, 8:44454 (R;US)
Podesta, D.L., *See* Dalder, E.N.C., 8:45262
Pohl, M., *See* Schmeling, E.L., 8:44238
Pohland, F.G., *See* Cross, W.H., 8:43446
Pohlmann, G., *See* Hollaender, W., 8:44705
Polak, M., *See* Laczny, M.J., 8:44737
Polchinski, J., *See* Gaillard, M.K., 8:44957
Polian, A., Brillouin scattering from H_2O: Liquid, ice VI, and ice VII, 8:44301 (J;US)
Polivanov, I.F., Method for calculating the lifetime of a heterogeneous reactor with regular lattice of reactor control system elements, 8:43850 (R;SU;In Russian)
Polkanov, V.A., *See* Golosaj, N.I., 8:45291
Pollard, B.D., *See* Schrader, D.M., 8:44317
Pollock, T.C., *See* Soltes, E.J., 8:43443
Polyakov, Yu.N., *See* Pimenov, V.V., 8:43892
Polzonetti, A., *See* de Socio, L.M., 8:44415

Ponticq, M., *See* Puill, A., 8:43762
Pontow, B., Development of a continuous feeding system for coal dust pressure gasification, 8:43146 (R;DE;In German)
Ponzoni Filho, P., *See* Fernandes, V.B., 8:43776
Popescu, I.I., Time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device, 8:45129 (RA;CS)
Popryadukhin, A.P., *See* Artemenkov, L.I., 8:45224
Porile, N.T., *See* Ohkubo, Y., 8:45007
Porstendoerfer, J., *See* Scheibel, H.G., 8:44676
Porter, C.R., *See* Barth, D.S., 8:43993
Porter, G., TMX upgrade ECRH schematic, 8:45202 (RA;US)
Porter, W.H., De Graff Nature Center: passive solar heated park and recreational building, 8:43605 (RA;US)
Hog confinement farrowing-nursery building, 8:43632 (RA;US)
Portugalov, Yu.I., *See* Balbekov, V.I., 8:44493
Post, D., *See* Heifetz, D., 8:45196
Post, D.E., Overview of the use of Monte Carlo methods in controlled thermonuclear fusion research, 8:45194 (J;US)
Post, K., Investigations for chromatographic separation and determination of the rare earths and auxiliary group elements, 8:44325 (R;DE;In German)
Poston, J.W., *See* Ryan, M.T., 8:44706
Powell, J., *See* Takahashi, H., 8:43836
Powell, J.R., FBR and RBR particle bed space reactors, 8:43818 (R;US)
Pozharova, E.A., *See* Gorichev, P.A., 8:44578
Praes, J.G.L., Adaptation of TOODEE-2 computer code for reflood analysis in Angra-1 reactor, 8:43916 (RA;BR;In Portuguese)
Prager, S., *See* Macosko, C.W., 8:43270
Prahm, L.P., *See* Gislason, K.B., 8:44680
Pramanik, D., Direct determination of a radiation-damage profile with atomic resolution in ion-irradiated platinum. MSC report No. 5030, 8:44131 (R;US)
Prater, L.S., *See* Eddy, P.A., 8:44748
Prater, T.A., Crack growth studies on a carbon steel in oxygenated high-pressure water at elevated temperatures, 8:44189 (RA;US)
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8:44188 (RA;US)
Pratt, E., *See* McDevitt, P., 8:43661
Preinhaelter, J., Power spectrum optimization of the three-waveguide grill for the T-7 tokamak, 8:45243 (RA;CS)
See Datlov, J., 8:45242
See Lacina, J., 8:45113, 8:45137
Prejzendorf, V.A., *See* Kuznetsov, A.B., 8:44498
Preston, F., *See* Cannon, M., 8:45090
Preston-Anderson, A., *See* Weseman, M., 8:45287
Preuss, O., Beryllium health hazards, 8:44805 (R;FR;In French)
Preusser, T., Investigations by model theory of fast breeder reactor fuel pins and application to special safety experiments, 8:43928 (R;DE;In German)
Present state of the URANUS code, 8:43811 (RA;DE;In German)
See Boecking, G., 8:43923
Price, J.D., *See* Wan, E.I., 8:43432, 8:43456
Prince, M.B., Photovoltaic status assessment: government perspective, 8:43497 (RA;US)
Prinzler, H., Dynamics of ionization and transport in a magnetically confined plasma column, 8:45128 (RA;CS)
Prior, C.R., Multiturn injection for heavy ion fusion, 8:44523 (RA;DE)
See Maidment, J.R.M., 8:44525
Prokoshkin, Yu.D., *See* Inyakin, A.V., 8:44625
Prono, D.S., *See* Turner, W.C., 8:45168
Proshin, M.A., *See* Vikhrev, V.V., 8:45105
Prosser, F.W. Jr., *See* Ernst, H., 8:45010
Protasov, I.I., *See* Golenetskij, S.P., 8:44613
Prowler, D., Passive building climatology curriculum development, 8:43620 (RA;US)
Pruess, K., GMINC: a mesh generator for flow simulations in fractured reservoirs, 8:43269 (R;US)
Pryanichnikov, V.I., *See* Mamedov, I.S., 8:44428
Pryor, R.A., *See* Lesk, I.A., 8:43512
Puill, A., Irradiation in the CAP reactor of FRAGEMA fuel assemblies under power transients representative of super imposed load follow and remote control regimes, 8:43762 (R;FR)
Pult, J.C., *See* Lefort, G., 8:43342
Pullen, W.C., *See* Bell, R.T., 8:44209
Punyakumleard, A., *See* Flanigan, V.J., 8:43440
Pupkov, Yu.A., *See* Bokov, M.A., 8:44556
Purson, J.D., Evaluation of geochemical properties used in area-to-location screening for a nuclear waste repository at the Nevada Test Site, 8:43357 (R;US)
Puttaswamy, N.G., *See* Bhat, C.M., 8:44999
Pye, E.K., *See* Mitchell, R.W., 8:44783
Pywell, R.E., Photoneutron cross sections for the silicon isotopes, 8:44993 (J;US)

Q

Qassim, R.Y., *See* Kinrys, S., 8:44419
Quant, F.R., *See* Agarwal, J.K., 8:44636
Quellet, M., Historical changes in acid precipitation and heavy metals deposition originating from fossil fuel combustion in Eastern North America as revealed by Lake Sediment geochemistry, 8:44736 (RA;DK)
Quick, C.R. Jr., CARS investigation of HBr and H_2 collisions with hot H atoms produced by ArF laser photolysis of HBr, 8:44883 (J;US)
Quinby, T.C., *See* Aaron, W., 8:44248
Qvale, B., Notes in turbomachinery. Pt. 1. Design examples, 8:44465 (R;DK)
Notes in turbomachinery. Pt. 2. Experimental and theoretical methods, 8:44466 (R;DK)
Notes in turbomachinery. Pt. 3. Basic relationships, 8:44467 (R;DK)

R

Rabitz, H., *See* Larter, R., 8:44335
Racca, R.A., *See* Ernst, H., 8:45010
Rachiele, R., *See* Nelson, P.H., 8:43362
Radder, J.A., *See* Curry, J.J., 8:43757
Radousky, H.B., Superconducting and magnetic properties of Y/sub 0.9/ R/ sub 0.1/Rh_4B_4, 8:44251 (J;US)
Ragan, H.A., Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8:44759 (R;US)
Ragheb, M.M.H., Methodology for Monte Carlo geometrical perturbation analysis with application to a process heat fusion blanket, 8:45282 (J;US)
Rahman, A., *See* Parrinello, M., 8:44358, 8:45076
Rahn, K.M.M., Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components, 8:43769 (R;BR;In Portuguese)
Rai, D., Neptunium concentrations in solutions contacting actinide-doped glass, 8:43398 (J;US)
Raja, R., *See* Bitar, K.M., 8:44953
Rajo Rao, M., *See* Bhat, C.M., 8:44999
Rakhimov, R., *See* Ortykov, A., 8:44871
Raley, D.L., *See* Mulloney, J.A., 8:43455
Raman, S., ^{36}Cl superallowed β decay, 8:44994 (J;US)
See Walkiewicz, T.A., 8:45005
Ramaswami, S., Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8:43233 (RA;US)
Ramavataram, S., 1982 Recent References (Cumulation), 8:44968 (J;US)
Ramberg, L., Effects of coal combustion and acidification on the cadmium exposure of the Swedish population, 8:44806 (RA;DK)
Ramdahl, T., Chemical characterization of emmissions from wood-fired stoves, 8:43510 (R;NO;In Norwegian)
Ramqvist, G., *See* Wilson, C.R., 8:44818
Ramsey, J.M., *See* Ensor, D.D., 8:44330
Ramsey, N.F., *See* Heckel, B., 8:45053
Ramstroem, E., *See* Olsson, N., 8:45015
Ramteke, D.S., *See* Thakre, R., 8:43736
Ranga Raju, K.G., Resistance characteristics of rough open channels with a rigid boundary, 8:44433 (R;DE)
Rao, A.R., *See* Sinnock, S., 8:44814
Rasmussen, K.E., Water content in solids, 8:44347 (TJ;US)
Rasmussen, P., Test of Tripod datalogger, 8:43720 (R;DK;In Danish)
Rasolt, M., *See* Kahn, L.M., 8:44220
Rau, E.I., *See* Pattengill, M.G., 8:43350
Rau, J., *See* Fukuda, K., 8:43848
Raupach, F., *See* Berger, C., 8:44915
Raus, V., *See* Piffl, V., 8:45126
Rausch, E.O., Formation of excited H by impact of H_1^+, H_2^+, H_3^+ ions on metal surfaces, 8:44145 (RA;BU)
Ravnik, M., *See* Trkov, A., 8:43842
Rawlins, W.T., *See* Armstrong, R.A., 8:45188
Ray, L., *See* Clark, B.C., 8:44996

Ray, W.H., New approaches to the dynamics of nonlinear systems with implications for process and control system design, 8:44372 (B;US)
Rayburn, J.A., *See* Christensen, D.C., 8:43358
Raymond, J.R., *See* Kannberg, L.D., 8:43974
Raymond, K.N., *See* Kappel, M.J., 8:44342
Raynor, S., Electronic structure of H/sub n/$^{+}$ and HeH/sub n/$^{+}$ clusters, 8:44341 (J;US)
Razdobarin, G.T., *See* Bulyginskij, D.G., 8:45116
Razvi, J., *See* Wethington, J.A., 8:43394
Reagan, D.P., *See* Waide, R.B., 8:44714
Rebeiz, C.A., Chloroplast bioengineering: the greening of chloroplasts in vitro, 8:43526 (J;US)
Rebel, H., Laser induced fluorescence spectroscopy in atomic beams of radioactive nuclides, 8:44879 (R;DE)
Reddoch, T.W., Electric utility intertie issues for small, dispersed power sources, 8:44041 (RA;US)
See Curtice, D.H., 8:43723
Redmon, J.W., Study of the effects of austenitizing and tempering heat treatments on the alloy HT-9, 8:44135 (R;US)
Reed, J.H., *See* Collins, N.E., 8:44026
Reed, R.T., Passive solar home, Houston, 8:43577 (RA;US)
Reed, T.B., Predictive model for stratified downdraft gasification of biomass, 8:43429 (RA;US)
Reeder, B.C., Design of a passive solar multi-use addition for St. Mary's School, 8:44062 (RA;US)
Rees, G.H., Bunching of intense beams, 8:44490 (RA;DE)
Rutherford SNS beam experiments, 8:44527 (RA;DE)
Reeves, C.A. Jr., Procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of the CPT-8000/8100 word processor, 8:45318 (R;US)
Reeves, J.N., Solar One Project, 8:43537 (RA;US)
Rehm, W., *See* Ehrhardt, K.D., 8:43922
Reich, C.W., *See* Greenwood, R.C., 8:45014
See Helmer, R.G., 8:45016
Reich, M., *See* Hwang, H., 8:43944
Reid, I.H., *See* Thompson, M.W., 8:44844
Reif, G.R., *See* Mead, K.E., 8:44642
Reihl, B., *See* Arko, A.J., 8:44223
Reinstema, S.R., Vacancy annealing stage in heavy ion implanted bcc metals, 8:44149 (RA;SU)
Reischl, G.P., Equivalence of low pressure impactor and differential mobility analyzer data for submicron particle size distributions, 8:44635 (RA;DE)
Remer, J.S., *See* Nelson, P.H., 8:43362
Remiarz, R.J., *See* Agarwal, J.K., 8:44636
Remizov, O.V., *See* Vorob'ev, V.A., 8:43854
Remizovich, V.S., Kinetics of charged particle implantation in dielectrics taking into account the effect of space charge build-up, 8:45043 (RA;SU;In Russian)
Renke, C.A.C., Calculation of integral parameters sensitivity in fast reactors, 8:43807 (RA;BR;In Portuguese)
Resler, D.A., *See* Koehler, P.E., 8:44988
Reuss, M., Comparison of different methods for estimating the leaching of heavy metals from coal combustion waste, 8:43202 (RA;DK)
See Meuren, K., 8:43546
Reutov, V.F., *See* Ibragimov, Sh.Sh., 8:44158
Revenko, A.V., *See* Zhargal, Ch., 8:44596
Reyes, M., Case-control study of brain tumors among white males employed at the Rocky Flats Plant, 8:44800 (R;US)
Reynolds, R.S., *See* Brehm, R., 8:43830
Reynolds, T.D., Pronghorn responses to hunting coyotes, 8:44715 (J;US)
Rhodes, D., Fatigue crack growth from blunt notches, 8:44442 (R;DE)
Rice, D.W. Jr., *See* Harrison, F.L., 8:43877
Richard-Haggard, K., Economic potential of alternative land and natural resource uses at the Nevada Test Site, Nye County, Nevada, 8:44721 (R;US)
Richards, J.E., *See* Esch, E.L., 8:43745
Richards, P.M., Concentration dependence of relaxation by dipole impurities, 8:45071 (J;US)
Richardson, J.W., *See* Shelton, R.N., 8:44245
Richman, R.M., Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983, 8:44356 (R;US)
Richter, B., *See* Loehr, B., 8:44928
Richter, F.W., *See* Jupe, H., 8:44671
Richter, J.L., Transmit versus receive gains for microwave dish antennas, 8:44458 (J;US)
Ricketts, M.H., Binding of the rat liver thyroid hormone nuclear receptor to deoxyribonucleic acid using a gel filtration assay, 8:44803 (B;ZA)
Rieger, J.T., *See* Eddy, P.A., 8:44748
Rieke, R.D., Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8:44349 (R;US)
Rigaud, J.L., *See* Louni, L., 8:44757
Rimini, E., *See* Campisano, S.U., 8:44148
Rioux, C., Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8:44973 (J;NL;In French)
Ritsema, B.S.M., Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8:44117 (R;NL;In Dutch)
Ritter, H.G., *See* Warwick, A.I., 8:44931
Rivkin, L., *See* Wilson, P.B., 8:44502
Rizy, D.T., *See* Reddoch, T.W., 8:44041
Roberson, N.R., *See* Woodworth, J.G., 8:44977
Roberson, R.B., *See* MacDougall, C.S., 8:44354
Roberts, E.H., System for obtaining high-integrity borehole fluid samples. National Uranium Resource Evaluation, 8:43313 (R;US)
Roberts, L., *See* O'Hara, F.A., 8:43345
Robertson, D.E., *See* Toste, A.P., 8:43396
Robertson, J.A.L., AECL programs for new applications for nuclear energy, 8:43832 (R;CA)
Robertson, R.G.H., *See* Gagliardi, C.A., 8:44987
Roberty, N.C., Energy supply and the swelling in solid fuels, 8:43865 (R;BR;In Portuguese)
Robillard, L., Thermal response of a mass of fluid to a constant cooling rate applied on its boundaries, 8:44413 (R;BR)
See Vasseur, P., 8:44423
Robinson, D.S., *See* Woo, K.C., 8:44258
Robinson, J.E., Energy spectra and charge states for H and He backscattered from Si in the energy range of 1.5-10 keV, 8:44853 (RA;SU)
Robinson, M.T., *See* Hou, M., 8:44860
Robinson, S.E., *See* Freedman, A.P., 8:44766
Robnett, J.D., Conversion to coal in Du Pont, 8:43728 (RA;US)
Rocamora, F.D. Jr., *See* do Amorim, E.S., 8:43888
Rocchia, R., Bragg crystal spectrometer for the soft X-ray diffuse background, 8:44563 (R;FR)
Rodin, A.M., *See* Arzumanyan, G.M., 8:44602
Rodrigo Otero, A., Operating experience in the J.E.N. with a fluidized-bed pilot plant, 8:43327 (TJ;US)
Production of UO_2, UO_3, and UF_4, 8:43328 (TJ;US)
Rodriguez, C.F., Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends, 8:44127 (R;US)
Roeda, D., Some radiopharmaceuticals derived from carbon-eleven labelled phosgene. Synthesis and clinical application, 8:44770 (R;NL)
Roeger, A. III, *See* Jones, J.E. Jr., 8:43153
Roehrlich, H., *See* Woelk, G., 8:44092
Roevekamp, M.H., Indium-111 labelled leucocyte scintigraphy in the diagnosis of inflammatory disease. A clinical study, 8:44769 (R;NL)
Rofail, N., *See* Casten, R.F., 8:45022
Roffman, H.K., *See* Voytko, J.D., 8:43234
Rogan, F.H., *See* Li, K., 8:43163
Rogers, J.D., Tokamak poloidal-field systems. Progress report, January 1-December 31, 1982, 8:45254 (R;US)
Rogov, V.A., *See* Borodin, V.E., 8:44573
Rogue, F., Results of instrument reliability study for high-level nuclear waste repositories, 8:43389 (J;US)
Rohwer, K., Stresses and deformations in laminated test specimens of carbon fiber reinforced composites, 8:44257 (R;DE)
Rojnishvili, E.Yu., *See* Borodin, V.E., 8:44573
Romanov, Yu.I., Multichannel fiber-optical lines in the control system of the "Polaris" source, 8:44543 (R;SU;In Russian)
Rome, J.A., Monte Carlo methods for optimizing torsatron configurations, 8:45195 (J;US)
Romig, A.D. Jr., Interdiffusion in β phase Cu—Al alloys, 8:44207 (J;US)
Ronge, B., Solubility of rocks and minerals in hot water. The chemical changes of water on heat storage in caverns, 8:43972 (R;SE;In Swedish)
Roof, R.B., Evidence for stacking faults in multiaxial strained alpha-brass, 8:44172 (R;US)

Rosen, H., Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8:45084 (J;US)
Rosenberg, I., *See* Awschalom, M., 8:45061, 8:45062
Rosenblatt, D.H., *See* Tong, S.Y., 8:44218
Rosenblum, S.S., *See* Keefe, D., 8:44471
Rosenfeld, A.H., Technical issues for building energy ratings, 8:44081 (R;US)
Rosenthal, M.S., Automatic seed identification technique for interstitial implants using three isocentric radiographs, 8:44778 (J;US)
Ross, G.G., *See* Gaillard, M.K., 8:44957
Ross, M., High-pressure equation of state of Li, Na, and K, 8:44199 (R;US)
See Gathers, G.R., 8:44200
Ross, R.I., Small and light thyratron grid driver, 8:44455 (R;US)
Rotarius, T., Long-term energy sources, 8:44053 (B;DE;In German)
Rothenberg, J.E., *See* Harris, S.E., 8:44631
Rothenflug, R., *See* Rocchia, R., 8:44563
Rougemont, D., *See* Baron, J.C., 8:44762, 8:44764
Rouse, R.E., Massachusetts Multi-Family Passive Solar Housing Program, 8:43551 (RA;US)
Roushey, W.J., *See* Pattengill, M.G., 8:43350
Roy, R., *See* Rioux, C., 8:44973
Roy, S.C., *See* Apfel, R.E., 8:44567, 8:44568
Rozhkov, V.V., Theory of thermal dechanneling from axial channels, 8:45045 (RA;SU;In Russian)
See Gann, V.V., 8:44157, 8:45046
Ruane, R.J., Aquatic effects of wet ash disposal and wet limestone scrubber systems, 8:43211 (RA;DK)
See Lin, Y.S., 8:44730
Rubin, M., Calculating heat transfer through windows, 8:44087 (J;GB)
Rubin, N.B., *See* Korenev, S.A., 8:45144
Rubin, S.B., *See* Bakhvalov, N.S., 8:44500
See Dolya, S.N., 8:44549
Rudenko, A.I., *See* Remizovich, V.S., 8:45043
Rudiger, J., *See* Grotzschel, R., 8:44274
Rundle, J.B., Viscoelastic-gravitational deformation by a rectangular thrust fault in a layered earth, 8:44821 (J;US)
Ruprecht, P., *See* Duerrfeld, R., 8:43151
Rusakovich, N.L., *See* Kuznetsov, V.I., 8:44546
Rusanov, E.A., *See* Krishtal, M.A., 8:44166, 8:44167
Russcher, G.E., Experiment operations plan for the MT-3 experiment in the NRU reactor, 8:43937 (R;US)
Rustamov, Sh.A., *See* Dekhtyar, I.Ya., 8:44164
Ruth, T.J., *See* Clark, J.L., 8:45021
Rutherford, P.H., *See* Peng, Y.K.M., 8:45256
Rutkowski, M.D., *See* Stringer, R.P., 8:43230
Ruzhitskij, V.V., *See* Neklyudov, I.M., 8:44279
Ryan, M.T., Radon dosimetry: a review of radon and radon daughter exposure conditions in dwellings and other structures, 8:44706 (R;US)
Rybalko, V.F., *See* Neklyudov, I.M., 8:44279
Rydevik, U., *See* Liem, H., 8:43201
Rymkevich, K.S., *See* Zhukov, A.V., 8:43803
Ryvkin, S.M., Semiconductor receivers of the pulse X-radiation based on cadmium telluride, 8:44614 (RA;SU;In Russian)
Ryzhov, Yu.A., *See* Gusev, K.I., 8:44845

S

Saboya, F.E.M., *See* Saboya, S.M., 8:44412
Saboya, S.M., Transfer coefficients for plate fin and elliptical tube heat exchangers, 8:44412 (R;BR)
Sacco, W., *See* Freire, C.F., 8:43918
Sachs, B., Qualitative approach to performance evaluation of passive solar residences, 8:43587 (RA;US)
Sackerer, D., Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers, 8:44363 (R;DE;In German)
Sacks, I.J., *See* Alesso, H.P., 8:43939
Sadana, D.K., Substitutional placement of phosphorus in ion implanted silicon by recrystallizing amorphous/crystalline interface, 8:44299 (J;US)
Sadovnikov, V.N., Unified system for information exchange between the ES-1040 computer and physical equipment via the MKK 880M controller, 8:44638 (R;SU;In Russian)
Safonova, M.B., *See* Alekseev, Yu.A., 8:45223
Saglio, R., In-service inspection of reactors, 8:43763 (R;FR;In French)
Sailor, V.L., *See* Hill, D., 8:44015
Sakabe, S., Numerical calculations of the ray trace, absorption distribution and absorption efficiency of the laser beam in spherical symmetric plasmas, 8:45228 (R;JP)
Sakamoto, Y., Surface cleaning by electron cyclotron resonance hydrogen plasma, 8:45251 (RA;JP;In Japanese)
Salomon-Sigogne, A., PICOLO 2 simulator. Programming and application to teaching, 8:43760 (R;FR;In French)
Saltbones, J., *See* Schjoldager, J., 8:44681
Salter, P.F., *See* Ames, L.L., 8:44819
Saltykov, A.I., *See* Nefed'eva, L.S., 8:45299
Salvador, L.A., Joint Westinghouse/SASOL commercial-scale fluidized-bed coal gasification project, 8:43159 (RA;US)
Salzborn, E., Low energy charge changing cross sections, 8:44840 (RA;DE)
Samarin, A.V., *See* Klimenko, S.V., 8:45293
Samojlenko, V.D., Analysis of the stress of a tokamak device vacuum chamber depending on the position of supports, 8:45232 (RA;SU;In Russian)
Sampaio, R., *See* Marchesin, D., 8:44411
Samskog, P., Geometric model of trapped electrons in x-ray irradiated single crystals of rhamnose, 8:44361 (J;US)
Samsonov, B.V., *See* Aver'yanov, P.G., 8:43792
Samsonov, E.V., *See* Glazov, A.A., 8:44494
See Zaplatin, N.L., 8:44477
Samsonov, V.A., *See* Vyskochil, S., 8:44593
Sanchez, M.G., Method for the dimensioning of a cantileva-beam submitted to aleatory effects, 8:44141 (R;BR;In Portuguese)
Sancier, K.M., *See* Wood, B.J., 8:43170
Sanders, S.J., *See* Ernst, H., 8:45010
Sandstroem, M., *See* Liem, H., 8:43201
Sandukovskij, V.G., *See* Gornov, M.G., 8:44589, 8:44594
Sanitz, D., *See* Bongardt, K., 8:44486
Sano, K., *See* Nakano, Y., 8:43861
Santini, D.J., Energy-price dynamics and US depressions: recent analogies, 8:43986 (R;US)
Preliminary evaluation of crisis-relocation fallout-shelter options. Volume 2. Detailed analysis, 8:44652 (R;US)
Sarantsev, V.P., *See* Dolbilov, G.V., 8:44476
Sargood, D.G., Charged particle reaction cross sections and nucleosynthesis, 8:44827 (R;AU)
Saricks, C.L., Identification and condenstion of railway fuel-savings measures and strategies, 8:44089 (R;US)
Sarlisky, T., *See* Mishonov, T., 8:45107
Sasaki, A., Vacuum system of the Heliotron E high temperature plasma system, 8:45250 (RA;JP;In Japanese)
Satchler, G.R., "Wine-bottle" optical potentials and the inelastic scattering of protons near 200 MeV, 8:44998 (J;NL)
See Kobos, A.M., 8:44991
Satija, S.K., *See* Majkrzak, C.F., 8:44253
Sato, M., *See* Sasaki, A., 8:45250
Sauer, R.H., Reclaiming mined lands in arid environments, 8:43252 (R;US)
Saum, C.J., Denitration of simulated fast reactor highly active liquor waste, 8:43364 (R;GB)
Sauter, A., *See* Jansky, J., 8:44191
Saval, S., *See* Blancas, A., 8:43521
Savchenko, O.V., *See* Kuz'min, E.S., 8:44538
Savos'kin, M.M., Energy yield calculation constant preparation in the ARAMAKO system, 8:43840 (R;SU;In Russian)
Saw, C.K., Location of deuterium in α-scandium, 8:44203 (J;US)
Sawyer, W., *See* Kuuskraa, V., 8:43295
Sayers, W., *See* Morgan, G., 8:43998
Scahill, J., *See* Diebold, J., 8:43433
Scally, R.L., *See* Coggiola, M.J., 8:44449
Scanlon, P.J., *See* Latta, B.M., 8:44875
Schaarschmidt, G., *See* Shelyakin, L.B., 8:44857
Schad, J., *See* Morgan, D.T., 8:44104
Schaechterle, K., *See* Angerer, F., 8:44754
Schaefer, R.W., *See* Smith, K.S., 8:43817
Schaerpf, O., *See* Heckel, B., 8:45053
Scharfmann, E., Modifications of the bubble rise model and heat transfer model used in RELAP 4/Mod 5 computer code for transient analysis 8:43915 (RA;BR;In Portuguese)
Schatz, G., *See* Rebel, H., 8:44879
Schatzmann, M., *See* Ranga Raju, K.G., 8:44433

Scheffel, J., Toroidal Extrap Equilibria, 8:45258 (R;SE)
Scheibel, H.G., Aerosol generator for monodisperse Ag- and NaCl-aerosols in the particle size range between 2 nm and 300 nm, 8:44676 (RA;DE)
Schelby, F., Systems approach to measuring short-duration acceleration transients, 8:44641 (R;US)
Schempp, A., *See* Klein, H., 8:44522
Scherpelz, R.I., *See* Moeller, M.P., 8:43964
Schertz, W.W., *See* Gorski, A.J., 8:43613
Scherzer, B.M.U., *See* Behrisch, R., 8:44152
See Seefeld, H., 8:44873
Schiferl, D., *See* Moore, D.S., 8:44327
Schiff, D., *See* Vachon, W.A., 8:43710
Schikarski, W.O., Aerosols in nuclear engineering, 8:44701 (RA;DE;In German)
Schiller, R.J., Design and performance of a cycle five house: a review, 8:43578 (RA;US)
Schilling, J.S., *See* Shaheen, S.A., 8:44224
Schirber, J.E., de Haas—van Alphen effect in Sc metal, 8:44212 (J;US)
See Anderson, J.R., 8:44197
Schjoldager, J., Photochemical oxidants in north-western Europe 1976-79. A pilot project, 8:44681 (R;NO)
Schlaich, J., *See* Mayr, G., 8:43701
Schlatter, D., *See* Loehr, B., 8:44928
Schless, D., *See* Kubie, G., 8:44668
Schliephake, R.W., *See* Kuehn, L., 8:43190
Schlueter, R.A., Modification of power system operation for significant wind generation penetration, 8:43722 (J;US)
Schmedeshagen, B., *See* Langhoff, J., 8:43155
Schmeling, E.L., Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings, 8:44238 (TJ;US)
Schmelz, K., Simulation irradiation of segregation-hardening Al and Ni alloys, 8:44170 (RA;DE;In German)
See Boecking, G., 8:43923
Schmidl, H., *See* Seefeld, H., 8:44873
Schmidt, F.A., *See* Schirber, J.E., 8:44212
Schmidt, G., *See* Lappus, G., 8:43300
Schmidt, H., Wind situation in coastal areas of the Federal Republic of Germany with regard to wind energy utilization (especially planning of compound systems), 8:43674 (RA;DE;In German)
Schmidt, S.C., *See* Moore, D.S., 8:44327
Schmitt, F.J., *See* Ahlf, J., 8:44138
Schneider, D., *See* Vager, Z., 8:44900, 8:44902
Schneider, H., *See* Neirinck, L., 8:43464
Schneider, R.F., Immobilizing defense waste at the Savannah River Project, 8:43349 (R;US)
Schneider, W.F.W., *See* Geissel, H., 8:45041
Schnitzer, H.J., *See* Kirsch, L.E., 8:44911
Schoch, P.M., Space potential, temperature, and density profile measurements on RENTOR, 8:45101 (R;US)
Schock, R.N., Strain behavior of a granite and a graywacke sandstone in tension, 8:44822 (J;US)
Schoessow, P.V., Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8:44920 (R;US)
Schrader, D.M., Positron lifetime spectra of annealed argon matrices, 8:44317 (BA;NL)
Schrader-Reichhardt, U., Influence of hyperthermia on the biological effects of low LET-radiation with different energy spectra, 8:44794 (R;DE;In German)
Schramm, D.N., Early universe and high-energy physics, 8:44831 (J;US)
Schreiber, R.K., *See* DeAngelis, D.L., 8:44713
Schroeter, H.J., *See* Juentgen, H., 8:43240
Schuemichen, C., *See* Koehler, D., 8:44771
Schuller, I.K., *See* Khan, M.R., 8:44204
Schultz, P.J., Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8:44205 (J;US)
Schulz, H., *See* Meuren, K., 8:43546
Schulze, H.D., *See* Fuhlrott, H., 8:44190
Schuresko, D.D., *See* Hogan, J.T., 8:45257
Schuss, Z., *See* Ben-Jacob, E., 8:44394
Schuurman, W., *See* Bogert, A.J. van den, 8:45154
Schwarte, H., *See* Greff, E., 8:43700
Schwarzer, K., *See* Ehrhardt, J., 8:43927
Schweider, D.H., *See* Curtis, J.N., 8:45290
Schweiger, W., Analytical investigation concerning condensation of steam with low air content, 8:43967 (TG;US)
Schwier, G., Further development and production of silicon carbide powders for pressureless sintering, 8:44241 (R;DE;In German)
Schwinges, B., *See* Schweiger, W., 8:43967
Scofield, M.P., System development: solar home heating, 8:43561 (RA;US)
Scott, A., *See* Baker, F.T., 8:45009
Scott, C.D., Fourth symposium on biotechnology in energy production and conservation, 8:43421 (B;US)
Scott, D.M., *See* Halzen, F., 8:44945
Scott, P.M., Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8:44181 (RA;US)
See Tomkins, D., 8:44187
Scriven, L.E., *See* Macosko, C.W., 8:43270
Searcy, J.Q., *See* Armijo, J.R., 8:43980
Sebald, A.V., Impact of controls in passive solar heating of buildings, 8:43567 (RA;US)
Sedlacek, Z., Pseudo-spectral numerical solution of the Korteweg-de Vries equation, 8:45132 (RA;CS)
See Preinhaelter, J., 8:45243
Seefeld, H., Sputtering and stoichiometric changes by bombardment of Ta_2O_5 with keV light ions, 8:44873 (RA;SU)
Seehars, D., To the resuspension of cerium-IV-oxide powder aggregates and measurement of their mass distribution, 8:44704 (RA;DE;In German)
Seery, D.J., Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981, 8:43191 (R;US)
Seidl, P.A., Observation of analog and nonanalog transitions in the reaction $^{56}Fe(\pi^+,\pi^-)^{56}Ni$, 8:44997 (J;US)
Seidman, D.N., *See* Herschitz, R., 8:44129
See Pramanik, D., 8:44131
See Yamamoto, M., 8:44130
Seitz, M.G., *See* Vandegrift, G.F., 8:43393
Seliverstov, I.N., *See* Glebov, A.P., 8:43839
Sellin, I.A., *See* Breinig, M., 8:44901
Sem, G.J., *See* Agarwal, J.K., 8:44636
Semenov, O.V., *See* Vaulina, I.G., 8:45234
Semerdzhiev, Kh.I., *See* Dolya, S.N., 8:44549
Semet, A., *See* Suckewer, S., 8:44400
Senatore, G., *See* Ballone, P., 8:45109
Senjanovic, G., *See* Caswell, W.E., 8:44958
See Mohapatra, R.N., 8:44944
Senner, A.E., Unified software of the ES-1040 computer for organization of graphic data representation in program packages of the "Disc-2" and "SYaO" real time systems, 8:45295 (R;SU;In Russian)
Senzer, S.N., Gaseous ion reactions in SiF_4 and SiF_4—D_2 mixtures, 8:44337 (J;US)
Serdaru, M., *See* Baron, J.C., 8:44765
Serdyukova, S.I., *See* Bakhvalov, N.S., 8:44500
Serdzhiapm'etri, F., *See* Evgrafov, G.N., 8:44632
Seredkin, S.V., *See* Aver'yanov, P.G., 8:43792
Serga, E.V., *See* Golosaj, N.I., 8:45291
Serne, R.J., *See* Sherwood, D.R., 8:43366
Serot, B.D., *See* Clark, B.C., 8:44996
Serrano, M.A.B., Modelling for great breaks accident analysis in the primary system of Angra 1 reactor, 8:43919 (RA;BR;In Portuguese)
Sertorio, L., *See* Feigenbaum, M., 8:45091
Sestak, B., Magnetic scalar potentials, 8:45133 (RA;CS)
Sever'yanov, V.M., *See* Aleksandrova, I.V., 8:43891
Sexton, F.W., *See* Ochoa, A. Jr., 8:44627
Shackelford, J.F., University of California participation in the CIRP round robin of residual-stress measurement, 8:44443 (R;US)
Shafer, B.D., *See* Mnich, T.M., 8:44628
Shah, C., *See* Baker, B., 8:44055
Shah, R.B., *See* Clausen, E.C., 8:43518
Shaheen, S.A., Simple scaling behavior in the magnetic susceptibility of $CeSn_3$ under high pressure, 8:44224 (J;US)
Shaing, K.C., Calculation of parallel viscosity in the plateau regime, 8:45177 (J;US)
Sham, T.K., *See* Eberhardt, W., 8:44896
Shamanov, V.V., *See* Gorichev, P.A., 8:44578
Shampine, L.F., Measuring stiffness, 8:45311 (R;US)
Shamsuarov, A.D., *See* Golosaj, N.I., 8:45291
Shamsutdinov, Sh.G., *See* Bystritskij, V.M., 8:44544
Shan, H.S., *See* Chen, C.T., 8:44344
Shaner, J.W., *See* Moore, D.S., 8:44327
Shapira, H.B., Reflective insulating blinds for window applications, 8:43630 (RA;US)
Sharapov, Eh.I., *See* Borzakov, S.B., 8:44592
Sharkey, A., *See* Hill, F.E., 8:43248
Sharma, S.C., *See* Chuang, S.Y., 8:44320
See Nash, J.K., 8:44322
Sharpe, D.M., *See* DeAngelis, D.L., 8:44713
Shastry, S., Nuclear structure of the low lying levels of ^{147}Eu from γ-γ

directional correlation measurements on ^{147}Eu, 8:45008 (J;US)
Shatalov, G.E., *See* Aleksandrov, V.D., 8:45056
Shaw, M.S., Effective spherical potentials for molecular fluid thermodynamics, 8:44303 (J;US)
Shaw, R.S., *See* Bruhns, H., 8:45184
Shayanfar, H., *See* Schlueter, R.A., 8:43722
Shchebiot, U.V., *See* Bukki, S.M., 8:44616
Shcherbakov, A.G., *See* Arsenin, V.V., 8:45106
Shcherbakov, Yu.A., Laser streamer chambers with increased pressure, 8:44601 (R;SU;In Russian)
Shchinov, B.G., *See* Beloshitskij, P.F., 8:44499
Shchukin, B.A., *See* Bogomolova, E.S., 8:44364
Shekar, B.C., *See* Vasseur, P., 8:44423
Sheline, P.K., *See* Maier, K.H., 8:45017
Shelontsev, I.I., *See* Glagolev, V.V., 8:44600, 8:44603
Shelton, R.N., Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8:44245 (J;US)
See Vining, C.B., 8:44310
Shelyakin, L.B., Scattering and sputtering under bombardment of a monocrystal by a gliding ion beam, 8:44857 (RA;SU)
Shen, S.Y., Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops, 8:43514 (BA;US)
Shenoy, G.K., *See* Noakes, D.R., 8:44309
Shepard, C.I., *See* Vavra, P.C., 8:45214
Shera, E.B., *See* Laubacher, D.B., 8:45012
Sheridan, D.R., *See* Wood, B.J., 8:43170
Sherman, J., *See* Klepper, M., 8:44074
Sherstyanov, D.I., *See* Zabolotin, V.P., 8:44495
Sherwood, D.R., Tailings treatment techniques for uranium mill waste: a review of existing information, 8:43366 (R;US)
Shevchenko, V.A., *See* Bobyr, V.V., 8:44575
Shevelev, G.A., *See* Grishchenko, V.F., 8:44270
Shibley, R.G., Toward passive and hybrid solar commercial buildings, 8:43589 (RA;US)
Shigaev, V.N., *See* Baginyan, S.A., 8:44605
Shimchik, V., *See* Slapa, M., 8:44615
Shimer, D.W., *See* Owen, E.W., 8:45260
Shimizu, M., *See* Takatsu, H., 8:45266
Shimon, J.E., *See* Flanigan, V.J., 8:43440
Shimshick, E.J., *See* Busche, R.M., 8:43523
Shinar, E., Analogous mechanisms of biological damage induced by ascorbate and superoxide in the presence of copper. Progress report, July 1982-June 1983, 8:44758 (R;US)
Shinbrot, M., *See* Shastry, S., 8:45008
Shinozuka, M., *See* Kako, T., 8:43943
Shirane, G., *See* Birgeneau, R.J., 8:44293
See Majkrzak, C.F., 8:44253
Shirley, D.A., *See* Tong, S.Y., 8:44218
Shishlyannikov, P.T., *See* Glazov, A.A., 8:44494
Shkarban, I.I., *See* Gusev, K.I., 8:44845
Shmelev, V.E., *See* Fedulin, V.N., 8:43750
Shmid, M., *See* Gill, R.L., 8:45026
Shmykov, A.A., *See* Bondarenko, G.G., 8:44154
Shonee, H., Ideal of the perfect magnet-superconducting systems, 8:44554 (R;US)
Shoji, T., Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels, 8:43859 (RA;US)
See Kondo, T., 8:43754
Sholeen, C.M., *See* Wynveen, R.A., 8:44697
Shooman, M., *See* Hwang, H., 8:43944
Shpak, M.T., *See* Tikhonov, E.A., 8:44409
Shtrajt, Eh, Basis software for microprogrammed channel controller for operation on-line with experimental physical installations, 8:44637 (R;SU;In Russian)
See Sadovnikov, V.N., 8:44638
Shui, V.H., Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8:43214 (R;US)
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8:43215 (R;US)
Shul'ga, N.F., *See* Akhiezer, I.A., 8:45047
Shulga, V.I., Angular distribution of ions scattered by monocrystal surface semichannels, 8:44859 (RA;SU)
Shulimov, V.N., *See* Aver'yanov, P.G., 8:43792
Shumakov, M.N., *See* Aleev, A.N., 8:44585
Shuster, R., Pellets as fuel. Basic properties and experience from tests in moving grate firing units, 8:43471 (R;SE;In Swedish)
Shustov, N.V., *See* Zaletin, V.M., 8:44617
Shustova, N.V., *See* Bulyginskij, D.G., 8:45116
Shuvalov, R.S., *See* Evgrafov, G.N., 8:44632
Shvidt, N.N., *See* Artemenkov, L.I., 8:45224
Sibulkin, M., *See* Berlad, A.L., 8:43935
Siciliano, E.R., *See* Johnson, M.B., 8:45034
Sidman, S., CAMAC interface for TPC data-acquisition electronics, 8:44620 (R;US)
Siebold, A., *See* Koehler, D., 8:44771
Siegel, A.I., *See* Knee, H.E., 8:43956
Siegel, M.D., *See* DeDuck, P.F., 8:43641
Siegel, R.W., *See* Chakraborty, B., 8:44216
See Smedskjaer, L.C., 8:44230
Siemens, D.H., *See* Wheelwright, E.J., 8:43391
Siemroth, P., Crater formation by high current discharges in vacuum, 8:45246 (RA;CS)
Siffert, P., *See* Grob, A., 8:44269
Sigal, L.L., *See* Eddlemon, G.K., 8:43222
Sil'nov, S.M., *See* Arzumanyan, G.M., 8:44602
Silady, F.A., *See* Barsell, A.W., 8:43879
Silaev, V.I., *See* Mel'nichenko, I.A., 8:44577
Silva, R. da, Implementation, of the superfish computer code in the CYBER computer system of IEAV (Instituto de Estudos Avancados) in Brazil, 8:44469 (R;BR;In Portuguese)
Silveira, T.L. da, *See* Taroco, E., 8:43857
Silver, C., *See* Harding, W., 8:43936
Silver, J.A., Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8:44659 (R;US)
Silverman, P.J., *See* Feldman, L.C., 8:44856
Simane, C., *See* Belov, A.G., 8:44547
Simhan, K., Study on the dynamic stress of wind energy converters with vertical axis and on starting- and overload control, 8:43688 (RA;DE;In German)
Simmons, J.A., *See* Wan, E.I., 8:43456
Simmons, J.E., *See* Denes, P., 8:44986
Simonen, T.C., Operation of the tandem-mirror plasma experiment with skew neutral-beam injection, 8:45187 (J;US)
Simpson, J.C., *See* Gilbert, R.O., 8:44718
Sims, G., *See* Dolan, L.S., 8:43513
Sin'govskij, A.V., *See* Inyakin, A.V., 8:44625
Sineath, H.H., *See* Flanigan, V.J., 8:43426
Singh, J.N., Dynamic qualification of safety-related equipment, 8:43902 (R;US)
Singh, S.P.N., Environmental control technology for gaseous emissions, 8:43238 (RA;US)
Sinha, A., *See* Chau, L.L., 8:44961
Sinnett, C., *See* Jones, G.E. Jr., 8:43176
Sinnock, S., Heuristic method for measurement and characterization of river meander wavelength, 8:44814 (R;US)
Sission, K., *See* Anjaneyulu, Y., 8:45078
Sivertsen, B., *See* Pacyna, J.M., 8:43241
Sivkova, G.N., Mechanical strength calculation of the disk type windings with elastic couplings by the finite element method, 8:45235 (RA;SU;In Russian)
Sizaya, E.N., *See* Pinos, I.B., 8:45145
Sizmann, R., *See* Varelas, C., 8:44143
Sizonenko, V.L., *See* Volkov, Yu.F., 8:45237
Skaarup, P., *See* Bundgaard, J., 8:44640
Skarlos, L., Texaco coal gasification process: leach characteristics of slags, 8:43229 (RA;US)
Skibenko, A.I., *See* Pinos, I.B., 8:45145
Skiens, W.E., *See* Cline, J.F., 8:43390
Skiff, F., *See* Wong, K.L., 8:45150
Skinner, C.H., *See* Suckewer, S., 8:44400
Sklarew, D.S., Chemical and mutagenic characteristics of diesel-exhaust particles from different diesel fuels, 8:44687 (R;US)
Skoeldberg, H., Measurements of heat radiation in a fluidized bed combustor, 8:43261 (R;SE;In Swedish)
Skolyszewski, J., Radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx, 8:44773 (R;PL;In Polish)
Radiation therapy of tumours of the central nervous system, 8:44774 (R;PL;In Polish)
Skopik, D., *See* Friar, J.L., 8:44972
Skovoroda, A.A., *See* Arsenin, V.V., 8:45106
Skupsky, S., Uniformity of energy deposition for laser driven fusion, 8:45270 (J;US)
Skvarna, P.E., *See* Reeves, J.N., 8:43537

Slape, M., Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8:44615 (RA;SU;In Russian)
Slavik, J., Helium population model, 8:45136 (RA;CS)
Slezov, V.V., *See* Bolotov, V.N., 8:44877
Sliwkowski, J., Application of phase change materials in passive solar systems, 8:43625 (RA;US)
Slobodrian, R.J., *See* Rioux, C., 8:44973
Slough, J., *See* Hoffman, A.L., 8:45185
Sluyters, T., Status of the AGS polarized negative-ion source, 8:44512 (R;US)
See Alessi, J.G., 8:44511
Smarr, L., *See* Smith, M.D., 8:44832
Smedman, A.S., Structure of turbulence at Maglarp 1, 8:43676 (R;SE;In Swedish)
Smedskjaer, L.C., Positron annihilation measurements of vacancy formation in Ni and Ni(Ge), 8:44230 (BA;NL)
Positron annihilation as a technique for dislocation line studies, 8:44235 (BA;US)
Smethie, W. Jr., *See* Takahashi, T., 8:44742
Smiers, L., *See* van Wees, F.G.H., 8:44099
Smirnov, A.A., *See* D'yachkov, E.I., 8:44536
Smirnov, A.N., *See* Bulyginskij, D.G., 8:45116
Smirnov, L.S., *See* Dvurechenskij, A.V., 8:44275
Smit, J., *See* de Boer, A.A., 8:43668
Smith, C.F., *See* Alesso, H.P., 8:43939
Smith, C.H., *See* Young, D.A., 8:44450
Smith, D.L., Matrix formalism for uncertainty analysis, 8:45093 (J;US)
See Brown, D.J., 8:43339
Smith, G.R., *See* Cohen, B.I., 8:45161
Smith, J.E., *See* Saricks, C.L., 8:44089
Smith, J.H., *See* Chuang, S.Y., 8:44320
Smith, J.L., *See* Thompson, J.D., 8:44221
See Wire, M.S., 8:44213
Smith, J.M., Fermentation studies on extracts of beet, 8:43452 (R;NZ)
Smith, K.S., Recent developments in the central worth discrepancy, 8:43817 (R;US)
Smith, M.D., Bubbles, jets, and clouds in active galactic nuclei, 8:44832 (J;US)
Smith, M.R., Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8:43157 (RA;US)
Smith, R.D., *See* Baer, D.R., 8:43193
Smith, W.H., *See* Wynveen, R.A., 8:44697
Smits, F.C.R.M., *See* Marshall, H.A., 8:43154
Snead, C.L. Jr., Recovery of deformed and hydrogen-charged palladium, 8:44228 (BA;NL)
See Cort, B., 8:44222
Snover, K.A., Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations, 8:44978 (J;US)
See Kuhlmann, E., 8:44992
Snyder, M.K., Passive/hybrid heating, cooling, and daylighting concepts for commercial/industrial pre-engineered buildings, 8:43594 (RA;US)
Sodja, J., Single-bunch beams for BC-75, 8:44479 (R;US)
Soedergren, D., Ventilation control by means of CO_2 determination, 8:44667 (RA;DK;In Swedish)
Sokel, R.J., *See* Ochoa, A. Jr., 8:44627
Solodilov, A.V., *See* Alejnikov, V.E., 8:44597
Solodkij, V.A., *See* Fedulin, V.N., 8:43750
Soltes, E.J., Fluidized-bed energy technology for biomass conversion, 8:43443 (J;US)
Soltys, M.N., *See* Milne, T.A., 8:43434
Somorjai, G.A., *See* Koestner, R.J., 8:44353
Son En Gan, *See* Zhargal, Ch., 8:44596
Sonder, E., Effect of oxidizing and reducing atmospheres at elevated temperatures on the electrical properties of zinc oxide varistors, 8:44459 (J;US)
Sontheimer, H., *See* Hedden, K., 8:44013
Sorale, S., *See* de Marteau, J.M., 8:43326
Sorensen, C.M., *See* King, G.B., 8:44909
Sorom, E.R., *See* Dunaway, P.B., 8:44722
Sosnowski, M., Determination of threshold and maximum operating electric stresses for selected high voltage insulations. Task II. Investigation of oil-filled paper insulated cables. Progress report No. 3. CTL-83-016, 8:44451 (R;US)
Soussaline, F., *See* Bustany, P., 8:44761
South, D.W., *See* Hanson, D.A., 8:43293
Spackman, W., *See* Walker, P.L. Jr., 8:43164
Spalthoff, W., *See* Ahlf, J., 8:44138
Sparks, C.J. Jr., Research with X rays, 8:45055 (J;CS;In Czech)
Spejewski, E.H., *See* Mlekodaj, R.L., 8:45013
Spence, D., *See* Wang, R., 8:44336
Spencer, H.A., *See* Cullen, W.H., 8:43781
Spencer, J.E., *See* Shoaee, H., 8:44554
Spencer, J.L., *See* Li, K., 8:43163
Spencer, R.L., Adiabatic compression of elongated field-reversed configurations, 8:45182 (J;US)
Spiegelberg, R.deS.H., Calculation of critical parameters in uranium mixtures, 8:43844 (RA;BR;In Portuguese)
Spirchenko, Yu.V., *See* Samojlenko, V.D., 8:45232
See Sivkova, G.N., 8:45235
See Vaulina, I.G., 8:45234
Spittler, W., Wind power converter WEC 520 'long-term 41050', 8:43693 (RA;DE;In German)
Spohr, R., *See* Tress, G., 8:44386
Spong, D.A., *See* Hastings, D.E., 8:45180
Sprecher, W.M., *See* Benny, R.I., 8:43344
Sprinkle, J.K. Jr., End-crop box counter manual, 8:43405 (R;US)
Sprott, J.C., Protection of large capacitor banks, 8:43969 (J;US)
Sprung, J.L., *See* Strip, D.R., 8:43961
Srinivasan, S., Electrochemical and surface science research on fuel cells, 8:44054 (RA;US)
Sriraman, A.K., Chlorination of cooling waters-mechanism, 8:43208 (RA;DK)
Srivastava, V.J., *See* Chynoweth, D.P., 8:43447
St. John, M., *See* Anderson, G.L., 8:43173
Staal, J., *See* Klein, S., 8:44042
Stacey, W.M. Jr., Tokamak ETR objectives, characteristics, and critical issues, 8:45219 (R;US)
Staib, P., *See* Seefeld, H., 8:44873
Stallmann, F.W., Neutron spectral characterization of the fourth Nuclear Regulatory Commission Heavy Section Steel Technology IT-CT irradiation experiments: dosimetry and uncertainty analysis, 8:43786 (R;US)
Stalnaker, D.K., Electrochemical rebalance cell for Redox systems, 8:44057 (R;US)
Stanaland, R., Development of a passive solar design for a manufactured building, 8:43562 (RA;US)
Stanik, A.M., *See* Brazulev, D.P., 8:44535
Stark, R.A., A one-dimensional hybrid code for FRM startup, 8:45281 (J;US)
Starkov, V.A., *See* Polivanov, I.F., 8:43850
Starner, J.W., *See* Dreesen, D.R., 8:43347
Starrfield, S.G., Discovery of nonradial instability strips for hot, evolved stars, 8:44828 (J;US)
Stassis, C., *See* Saw, C.K., 8:44203
See Staudenmann, J., 8:44308
Staudenmann, J., Physical content of electron-charge-density distributions in A15 compounds, 8:44308 (J;US)
Staufenbiel, R., *See* Greff, E., 8:43700
Stavinoha, P., *See* Jungwirth, K., 8:45124
Steeley, W.J., *See* Hillesland, T. Jr., 8:43711
Steffen, R.M., *See* Laubacher, D.B., 8:45012
Steinberg, D.J., Equation of state of TiH_3. Progress report, 8:44244 (R;US)
Steinberg, E.P., *See* Warwick, A.I., 8:44931
Steinberg, M.P., *See* Brumm, T.J., 8:43525
Steinberg, R.I., *See* Cherry, M.L., 8:44830
Steinhagen-Schneider, G., Fucus Vesiculosus as a bioaccumulator of heavy metals, 8:44807 (R;DE;In German)
Stelzer, H., *See* Warwick, A.I., 8:44931
Stensgaard, I., *See* Feldman, L.C., 8:44856
Stephens, M.M., *See* Sprinkle, J.K. Jr., 8:43405
Stephenson, R., *See* Bateman, J.E., 8:44777
Sterkel, H.P., Design and analysis for piping systems, 8:43856 (R;BR)
Sterling, T., Entropy of self-avoiding surfaces on the lattice, 8:44962 (J;NL)
Stern, S., Kinetics of aggregation and annealing of defects in heavily X-irradiated alkali chloride crystals studied by positron annihilation, 8:44316 (BA;NL)
Stevens, J., Lower-hybrid current drive with opposing ohmic drive on PLT, 8:45152 (R;US)
See Jobes, F., 8:45148
Stevenson, A.W., Consequences of the neglect of TDS correction for temperature parameters, 8:44646 (R;AU)
Stewart, G.R., *See* Cort, B., 8:44222
See Wire, M.S., 8:44213
Stiles, E.W., *See* DeAngelis, D.L., 8:44713
Stingl, M., *See* Cassing, W., 8:45030
Stinton, D.P., Characterization of hydrofracture grouts for radionuclide migration, 8:43374 (R;US)
Stirpe, D., MC and A reform amendment: variance estimates and performance evaluation, 8:43410 (R;US)
Stocker, H., *See* Boguta, J., 8:45039
Stocking, H.E., *See* Austin, S.R., 8:43325
Stoeckel, J., Energy balance in TM-1-MH tokamak (ohmical heating), 8:45122 (RA;CS)
See Datlov, J., 8:45117, 8:45242
Stoecker, H., *See* Buchwald, G., 8:44531

Stokes, C.A., Production and market outlook for methanol in the 80's and 90's, 8:43450 (RA;US)
See Kirshenbaum, N., 8:43448
Stokes, R.H., *See* Wangler, T.P., 8:44483
Stolupin, V.A., *See* Bystritskij, V.M., 8:44544
Stone, M.A., Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9, 8:43802 (R;US)
Stone, S., *See* Andrews, L.J., 8:43646
Stopchenko, V.A., *See* Gumenyuk, S.A., 8:44572
Stotland, M.A., Electron thermal conduction in a tokamak when Joule heating, 8:45155 (R;SU;In Russian)
Strackerjan, H.J., *See* Simhan, K., 8:43688
Stralt, B.G., *See* Nakos, J.T., 8:44643
Straub, G.K., *See* Holian, B.L., 8:44311
See Wallace, D.C., 8:45089
Strauss, H.R., Numerical magnetohydrodynamic studies of magnetic mirrors, 8:45181 (J;US)
Strecker, J., *See* Pontow, B., 8:43146
Streets, D.G., *See* Garvey, D.B., 8:44658
Strelkov, V.S., Tokamak research in the Soviet Union, 8:45241 (RA;CS)
Strenzke, H., Application of process computers for cost-optimal control in power networks, 8:43741 (R;DE;In German)
Strickert, R.G., *See* Rai, D., 8:43398
Strindell, L., *See* Doe, T.W., 8:43363
Stringer, R.P., Environmental issues in planning a medium-Btu coal gasification plant serving industries: a case history in Philadelphia, 8:43230 (RA;US)
Strip, D.R., Sandia nuclear power plant siting study, 8:43961 (BA;US)
Strizhenov, D.S., *See* Gusev, K.I., 8:44845
Stroeble, H., Charged-particle exclusive analysis of central Ar+KCl and Ar+Pb reactions at 1.8 and 0.8 GeV nucleon, 8:45023 (J;US)
Stroemquist, L.H., Growth of mold in fuel chips, 8:43503 (R;SE;In Swedish)
Strojkov, V.N., *See* Nefed'eva, L.S., 8:45299
Strongin, M., *See* Eberhardt, W., 8:44896
See El-Batanouny, M., 8:44217
Strottman, D., Hydrodynamics and relativistic heavy-ion collisions, 8:44930 (R;US)
Struzhko, V.G., *See* Golovach, L.A., 8:45301
Strzondala, V., Electron impact ionization of highly charged molybdenum impurities in tokamak plasmas, 8:45119 (RA;CS)
Stuart, S., *See* Burleson, G.R., 8:44927
Stuart, W.B., *See* Walbridge, T.A. Jr., 8:43493
Stubican, C.S., Grain boundary and surface diffusion in oxide systems. Technical progress report, 8:44243 (R;US)
Stubican, V.S., *See* Osenbach, J.W., 8:44262
Sturm, D., *See* Blind, D., 8:43784
Suckewer, S., Population inversion and gain measurements for soft x-ray-laser development in a magnetically confined plasma column, 8:44400 (R;US)
See Brau, K., 8:45151
Suda, S.C., *See* Lower, C.W., 8:43407
Sudbury, J.D., Increased opportunities for coal in industrial markets, 8:43265 (RA;US)
Sugakov, V.I., Void lattice effect on the optical properties of metals, 8:44156 (RA;SU;In Russian)
Sugarbaker, E., *See* Alford, W.P., 8:45018
Sukharev, M.M., *See* Borodin, V.E., 8:44573
Sulc, V., Heat transfer in peripheral region of fast reactor fuel assembly. Part 2. Experimental study of temperature fields in fuel assembly side region at rated rod position, 8:43814 (R;CS;In Russian)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 3. Experimental study of temperature fields in fuel assembly side region at non-rated rod position, 8:43815 (R;CS;In Russian)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 4. Temperature conditions in fuel assembly with inserts in marginal cells, 8:43816 (R;CS;In Russian)
Sumbaev, A.P., *See* Dolbilov, G.V., 8:44476
Sundheim, B.R., *See* Crozier, E.D., 8:44286
Sundstrom, D.W., Uses of by-product lignins from alcohol fuel processes, 8:43457 (J;US)
Sunier, J.W., *See* Cizewski, J.A., 8:45019
Surnin, A.F., *See* Kulagin, N.T., 8:45002
Suski, J., *See* Grotzschel, R., 8:44274
Svalstad, D.K., Forced ventilation analysis of a commercial high-level nuclear waste repository in tuff. Topical report RSI-0175, 8:43382 (R;US)
Svanoe, P.H., *See* Mercer, R., 8:43586
Sviridenko, E.Ya., *See* Zhukov, A.V., 8:43803
Swaby, L.G., *See* Forziati, A.F., 8:43999
Swanson, M.L., Study of point defects by channeling measurements of solute atom displacements, 8:44147 (RA;SU)
Swanson, R.E., *See* Holian, B.L., 8:44311
Swanson, S., Problem of abandoned uranium tailings in northern Saskatchewan. An overview, 8:43395 (R;CA)
Swanson, W.P., *See* Busick, D.D., 8:45060
Sweedler, A.R., *See* Cort, B., 8:44222
Swegle, J., Stability of relativistic laminar flow equilibria for electrons drifting in crossed fields, 8:45271 (J;US)
Theoretical aspects of ionic loss in transmission lines magnetically insulated against electron loss, 8:43742 (J;US)
Swenson, D.V., Modeling and analysis of drag-bit cutting, 8:43665 (R;US)
Swift, G.W., *See* Wheatley, J., 8:44436
Swift, R.P., Multiple fracturing of boreholes by using tailored-pulse loading, 8:44462 (J;US)
Swimm, R.T., *See* Merkle, L.D., 8:44264
Swisher, J.H., United States Department of Energy thermal energy storage program, 8:43976 (BA;NL)
Switendick, A.C., *See* Schirber, J.E., 8:44212
Sychkov, S.Ya., *See* Vishnyakov, V.V., 8:44584, 8:44590
Symons, J., *See* Crawford, H., 8:44880
Szabo, P.P., Investigation of thermal neutron sensitivity of LiF-TL detectors for routine personnel dosimetry at the thermal column of the ZR-4 reactor, 8:44609 (R;HU;In Hungarian)
Szajnbok, M., *See* Sanchez, M.G., 8:44141
Szalnay, J., *See* Asenjo, J.A., 8:43520

T

Taber, J.J., *See* Orr, F.M. Jr., 8:43276
Tabor, J.E., *See* Bobrowicz, F.W., 8:45049
Taczanowski, S., Neutron multiplier alternative for fusion reactor blankets, 8:45240 (R;PL)
Tahir, N.A., HIBALL target design: Ion-beam inertial confinement fusion pellet calculations, 8:44532 (RA;DE)
Takach, Y., *See* Wang, H.Y., 8:43462
Takahashi, H., Accelerator breeder with uranium, thorium target, 8:43836 (R;US)
See Kondo, T., 8:43754
See Shoji, T., 8:43859
Takahashi, K., *See* Itoh, M., 8:44674
Takahashi, T., Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface, 8:44742 (R;US)
Takatsu, H., Heat structural problems in JT-60, 8:45266 (RA;JP;In Japanese)
Takeda, H., Longitudinal phase-space matching between microtrons at 185 MeV, 8:44513 (R;US)
Tallec, M., Implementation of a pressurized water reactor simulator for teaching on a mini-computer, 8:43761 (R;FR;In French)
Talley, W.K., Federal government, the national laboratories, and the environment, 8:43991 (RA;US)
Tamm, H.F., *See* Langhoff, J., 8:43155
Tanabe, H., Ridge waveguide aperture antenna, 8:45197 (B;FR;In French)
Tanaka, M., *See* Nakano, Y., 8:43861
Tanaka, Y., *See* Laubacher, D.B., 8:45012
Tanca, M.C., *See* Darling, S.L., 8:43162
Tancredi, J., 60 GHz, 200 kW, CW gyrotron development, 8:45205 (RA;US)
Tang, Q.S., *See* Tong, T.W., 8:44438
Tange, T., Kinetic theory of the anomalous transport, 8:45142 (RA;JP)
Tannenbaum, M.J., *See* Baggett, N., 8:44561
Tanovic, L.A., Development of pits and cones on ion bombarded copper, 8:44142 (RA;SU)
Tantsyrev, G.D., Some general regularities of secondary ion emission form organic substances, 8:44869 (RA;SU;In Russian)
Tanzman, E.A., *See* Santini, D.J., 8:44652
Tao, J.C., SRC-I technology and its economics, 8:43150 (RA;US)
Taran, V.S., *See* Pinos, I.B., 8:45145
Tarle, G., *See* Ahlen, S.P., 8:45052
Taroco, E., Mechanical modelling of a structural performance of a pressure vessel submitted to the creep phenomenon, 8:43857 (R;BR;In Portuguese)
Tashlykov, I.S., *See* Belyj, I.M., 8:44276
Taska, J., *See* Turner, W.C., 8:45168

Tasoulias, G.W., Cryogenics for neutral beam testing, 8:45275 (BA;US)
Tateyama, R., *See* Daido, H., 8:45226
Taylor, C.B.G., Treatment of cancer of the uterus in developing countries: Proposals for a programme, 8:44768 (R;XA)
Taylor, J.M., *See* Luna, R.E., 8:43334
See Madsen, M.M., 8:43335
Taylor, M.W., Pulse compression by pulse-stacking in a KrF amplifier, 8:44404 (J;US)
Taylor, P.A., *See* Dodson, B.W., 8:45066
Taylor, R.A., *See* Cullen, W.H., 8:43781
Taylor, R.W., Photovoltaic system requirements: central and distributed applications, 8:43530 (RA;US)
Taylor, S., *See* de Vasconcelos, H.F., 8:44379
Tel'kovskij, V.G., Capture of H^+ and D_3^+ ions by stainless steel, 8:44153 (RA;SU;In Russian)
Dielectric surface structure change under ion irradiation, 8:44268 (RA;SU;In Russian)
See Ajnetdinov, E.B., 8:44855
Telegin, V.I., *See* Muralev, V.A., 8:45044
Televinova, T.M., *See* Bogomolova, E.S., 8:44364
Temam, R., *See* Foias, C., 8:44910
Temkin, R., MIT gyrotron program, 8:45207 (RA;US)
Ten Haken, R.K., *See* Awschalom, M., 8:45061, 8:45062
Teng, L.C., Discussions of the storage ring group, 8:44558 (RA;DE)
Superconducting magnets, 8:44376 (RA;DE)
Tenishev, A.Eh., *See* Vajsfel'd, A.M., 8:44611
Ter-Akop'yan, G.M., *See* Arzumanyan, G.M., 8:44602
Terent'ev, A.I., *See* Arkad'eva, E.N., 8:44612
See Ryvkin, S.M., 8:44614
Ternoey, S.E., Design of passive commercial buildings, 8:44063 (RA;US)
Tetel'baum, D.I., *See* Pavlov, P.V., 8:44272
Teterev, Yu.G., *See* Belov, A.G., 8:44545
Tetzlaff, G., Evaluation of wind measurements in great altitude for the site of GROWIAN, 8:43672 (RA;DE;In German)
See Laude, H., 8:43681
Tevini, M., Influence of enhanced UV-B irradiation on the growth and composition of plants, 8:44790 (R;DE;In German)
Thadani, A., *See* El-Bassioni, A., 8:43958
Thakre, R., Thermal power plant emission: effect on ecosystem, 8:43736 (RA;DK)
Theis, J., *See* Buchwald, G., 8:44531
Thellier, F., CO_2-based ventilation in buildings, 8:44080 (R;XE;In French and English)
Thergaonkar, V.P., *See* Thakre, R., 8:43736
Theunert, S., *See* Laude, H., 8:43681
See Tetzlaff, G., 8:43672
Thieberger, P., Possible use of synchrotrons as post-acceleration boosters for tandems, 8:44509 (R;US)
Thiele, H.M., Construction of two wind power plants AEROMAN 11/11 for Indonesia, 8:43702 (RA;DE;In German)
GROWIAN - rotor blades, 8:43690 (RA;DE;In German)
Thiell, G., *See* Babonneau, D., 8:44836
Thien, P., *See* Luerig, H.J., 8:43400
Thierens, H.M., *See* Wouters, J.M., 8:45006
Thigpen, P.L., Liquid fuels from wood by continuous operation of the Albany, Oregon biomass liquefaction facility, 8:43441 (BA;US)
Thode, E.F., *See* Dreesen, D.R., 8:43347, 8:43348
Thomas, D.O., Passive solar commercialization in the Northeast, 8:43554 (RA;US)
Thomas, E.W., *See* Rausch, E.O., 8:44145
Thomas, G.R., *See* Chung, H.M., 8:43899
Thomas, R.L., DOE/NASA large horizontal axis wind turbine research and development, 8:43708 (RA;US)
Thompson, D.S., *See* Hill, R.W., 8:43186
Thompson, J.D., Two critical points on the γ-α phase boundary of cerium alloys, 8:44221 (J;US)
See Lim, K.C., 8:44226
Thompson, M.N., *See* Pywell, R.E., 8:44993
Thompson, M.W., Atom collision processes in sputtering, 8:44844 (RA;SU)
Thompson, P.B., *See* Johnson, R.L., 8:45199
Thompson, S.L., Thermal/Hydraulic Analysis Research Program. Quarterly report, July-September 1982, 8:43938 (R;US)
Thoms, R.L., *See* Mogharrebi, M., 8:44823
Thomsen, M.F., Stability of electron distributions within the earth's bow shock, 8:44833 (J;US)
See Feldman, W.C., 8:44834
Thonart, P., *See* Michaux, M., 8:44784
Thorsness, C.B., *See* Hill, R.W., 8:43186
Thuer, J., *See* Drews, P., 8:43696
Thurenius, B., *See* Liem, H., 8:43201
Tien, C.L., *See* Tong, T.W., 8:44437, 8:44438
Tietjen, G., *See* Reyes, M., 8:44800
Tikhonov, E.A., Second-harmonic generation in a neodymium laser by crystalline powders of organic compounds, 8:44409 (TJ;US)
Tilley, D.R., *See* Woodworth, J.G., 8:44977
Tillmanns, H., *See* Glaser, H., 8:43189
Timoney, S.G., No-coolant diesel engine, 8:44121 (R;XE)
Timoshenko, G.N., *See* Alejnikov, V.E., 8:44597
Tippens, W.B., *See* Denes, P., 8:44986
Tiren, L., Safety considerations for light-water-reactor nuclear power plants: a Swedish perspective, 8:43947 (R;US)
Titov, A.I., *See* Abroyan, I.A., 8:44271
Tkachenko, L.M., *See* Balbekov, V.I., 8:44493
Tkhang, T.L., *See* Baginyan, S.A., 8:44605
See Govorun, N.N., 8:44583
See Ososkov, G.A., 8:44604
Tluchor, Z., *See* Krlin, L., 8:45248
Tobin, J.G., *See* Tong, S.Y., 8:44218
Todd, A.M.M., Monte Carlo studies of tandem-mirror plasmas interacting with waves in the ion-cyclotron range of frequencies (ICRF). Progress report, April 1, 1983-June 30, 1983, 8:45099 (R;US)
Toelle, R., *See* Duerrfeld, R., 8:43151
Toerroenen, K., Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels, 8:44180 (RA;US)
Tokarz, R.D., High temperature measuring device, 8:43954 (P;US)
Water level sensor and temperature profile detector, 8:43866 (P;US)
Tokuda, N., *See* Nakanishi, T., 8:44470
Tolliver, J.S., Monte Carlo calculation of resonant diffusion coefficients in the ELMO Bumpy Torus and the applicability of local diffusion theory, 8:45173 (J;US)
See Hastings, D.E., 8:45176
Tolstolutskaya, G.D., *See* Neklyudov, I.M., 8:44279
Tombrello, T.A., Sputtering in astrophysics and planetary science, 8:44824 (RA;SU)
Tomkins, D., Some thoughts on establishing design and inspection codes for corrosion fatigue, 8:44187 (RA;US)
Tompkins, H.G., Research needs for the use of polymer coatings for corrosion protection, 8:44136 (R;US)
Tomusiak, E.L., *See* Friar, J.L., 8:44947, 8:44972
Tong, S.Y., Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8:44218 (J;US)
Tong, T.W., Radiative heat transfer in fibrous insulations: Part 1: Analytical study, 8:44437 (J;US)
Radiative heat transfer in fibrous insulations: Part II: Experimental study, 8:44438 (J;US)
Tonkopryad, V.M., *See* Kuznetsov, Yu.K., 8:45252
Toppel, B.J., *See* Adams, C.H., 8:43797
Torabi, A., *See* Jensen, B., 8:44300
Tosi, M.P., *See* Ballone, P., 8:45109
Toste, A.P., Characterization of radionuclide behavior in low level waste sites, 8:43396 (J;US)
Toth, K.S., *See* Mlekodaj, R.L., 8:45013
Toulouse, G., Free energy probability distribution in the SK spin glass model, 8:45064 (RA;BR)
Towle, S., *See* Sachs, B., 8:43587
Towner, I.S., *See* Raman, S., 8:44994
Trachik, M., *See* Slapa, M., 8:44615
Trapp, R., *See* Tetzlaff, G., 8:43672
Treadwell, G.W., Systematic rotation and receiver location error effects on parabolic trough annual performance, 8:43648 (J;GB)
Treece, R.K., *See* Kim, W.S., 8:44393
Treleven, K., *See* Maeda, B.T., 8:43582
Trenholme, J.B., *See* Emmett, J.L., 8:44408
Tress, G., Mica nuclear track filters. Production, properties and applications, 8:44386 (RA;DE)
Treve, Y.M., *See* Foias, C., 8:44910
Tripathi, V.K., Thermal-resistive current filamentation in the cathode plasma of a pinch-reflex diode, 8:44887 (J;US)
See Grebogi, C., 8:45166
Trkov, A., Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained

using different evaluated libraries, 8:43842 (R;XA)
Trucano, T.G., Intermediate velocity penetration of steel spheres into deep aluminum targets, 8:44195 (R;US)
Trucker, D.C., *See* Garcia, A. III, 8:43494
Truemper, J., *See* Brinkmann, W., 8:44825
Trullinger, S.E., *See* Bishop, A.R., 8:45086
Trunk, H., *See* Blind, D., 8:43784
Truswell, A.E., *See* Scott, P.M., 8:44181
Tsakiris, G.D., *See* Ellis, R.F., 8:45178
Tsarenkov, A.P., *See* Zabolotin, V.P., 8:44495
Tseng, C.M., Dynamic simulation of the 2 MWt slowpoke heating reactor, 8:43796 (R;CA)
Tsetskhladze, T.V., Radiation induced defects in high dispersed silicon dioxide irradiated in the nuclear reactor at low temperatures, 8:44278 (RA;SU;In Russian)
Tsipinyuk, B.A., *See* Adylov, A.A., 8:44867
Tsujimoto, A., *See* Daido, H., 8:45226
Tsuo, Y.S., *See* Milstein, J.B., 8:43508
Tsurui, A., *See* Kako, T., 8:43943
Tsushima, A., Observation of spatial alfven resonance, 8:45138 (R;JP)
Tsyganov, A.A., *See* Bogomolova, E.S., 8:44364
Tsykanov, V.A., *See* Aver'yanov, P.G., 8:43792
Tucker, H.L., Determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions by potentiometric titration, 8:44328 (R;US)
Tuda, T., Linear theory of drift instability, 8:45140 (RA;JP)
Turkia, K.M., Southern Solar Energy Center Passive Buildings Program, 8:43555 (RA;US)
Turmashev, E., *See* Ayukhanov, A.H., 8:44865
Turnbull, J.A., *See* Appelhans, A.D., 8:43747
Turner, A.P.F., Applied aspects of bioelectrochemistry: fuel cells, sensors, and bioorganic synthesis, 8:44059 (J;US)
Turner, L., Two-dimensional, steady-state diffusion of a passive scalar in a flow field, 8:44950 (J;US)
Turner, L.R., Developments in eddy-current computation with eddynet, 8:44440 (R;US)
See Lari, R.J., 8:44441
Turner, M.S., *See* Freese, K., 8:44829
Turner, R.R., *See* Francis, C.W., 8:43221
Turner, W.C., Investigations of the magnetic structure and the decay of a plasma-gun-generated compact torus, 8:45168 (J;US)
Turro, N.J., Utilization of magnetic effects as a means of isotope enrichment. Annual technical progress report, July 1, 1982-June 30, 1983, 8:44348 (R;US)
Turzova, M., *See* Ososkov, G.A., 8:44604
Tuszewski, M., *See* Spencer, R.L., 8:45182
Twardock, A.R., *See* Kelman, B.J., 8:44786
Tylee, J.L., Estimation of bias shifts in a steam-generator water-level controller, 8:43869 (R;US)
Kalman filter-based gap conductance modeling, 8:43748 (R;US)

U

Ueda, N., *See* Nakanishi, T., 8:44470
Ueland, M., Solar atrium: a hybrid solar heating and cooling system, 8:43609 (RA;US)
Ukolov, S.I., *See* Tel'kovskij, V.G., 8:44153
Ullschmied, J., *See* Jungwirth, K., 8:45127
Ulriksen, P., *See* Bjelm, L., 8:43244
Umarji, A.M., *See* Noakes, D.R., 8:44309
Umland, E., N/sup /(1470) in the cloudy bag model, 8:44934 (J;US)
Unfried, E., Radioactivity measurement of building materials, 8:44699 (RA;AT;In German)
Upadhyaya, B.R., Bayesian parallel processing method for power plant diagnostics, 8:45277 (J;US)
Upton, J.E., Little Knife Field CO_2 minitest, Billings County, North Dakota. Final report. Volume 1. Technical report, 8:43271 (R;US)
Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report, 8:43272 (R;US)
Urban, J., Further development of detector-movement control electronics of whole-body counters, 8:44610 (R;HU;In Hungarian)
Urban, W.T., Neutron streaming through straight and single bend slots, 8:45255 (R;US)
Urbanic, V.F., Zircaloy behaviour in high temperature irradiated water, 8:43793 (R;CA)
Urin, V.N., *See* Isaev, A.G., 8:44550
Usacev, S., *See* Holy, K., 8:44574
Ushakov, P.A., *See* Zhukov, A.V., 8:43803
Usry, J.D., Passive and hybrid solar heating for manufactured housing, 8:43566 (RA;US)
Uthe, E.M., Vapor-phase soldering techniques. Final report, 8:44371 (R;US)
Utkin, V.A., *See* Bystritskij, V.M., 8:44544
Utochnkin, B.A., *See* Berezhnoj, V.A., 8:44570

V

Vachon, W.A., Domestic and foreign wind turbine research, 8:43710 (RA;US)
Vaeisaelae, S., *See* Meyer, R.A., 8:45001
Vager, Z., Coherent Stark levels in beam-foil—excited fast Rydberg atoms, 8:44900 (J;US)
Vager et al. respond:, 8:44902 (J;US)
Vaglio, R., *See* Gray, K.E., 8:44250
Vajsfel'd, A.M., Software for data processing from telescope of magnetostriction spark chamber in real time on the M-6000 computer, 8:44611 (R;SU;In Russian)
Valentine, K.H., *See* Kopp, M.K., 8:44624
Valevich, A.I., *See* Anishchenko, N.G., 8:44537
Vallario, R.W., *See* FitzPatrick, J.A., 8:43254
van Arkel, W.G., Determination of environment parameters for SELPE, a model for energy supply, 8:43984 (R;NL;In Dutch)
Van Brunt, R.J., Role of photodetachment in initiation of electric discharges in SF_6 and O_2, 8:45171 (J;US)
Van Der Sluys, W.A., Investigation of fatigue crack growth in SA508-2 in a 288°C PWR environment by a constant ΔK test method, 8:43780 (RA;US)
van Dijkum, P.H., Energy conservation in buildings, 8:44077 (R;NL;In Dutch)
Van Ginneken, A., *See* Hojvat, C., 8:44555
Van Harlingen, D.J., *See* Koch, R.H., 8:44398
van Heijden, P.G.M., *See* Ritsema, B.S.M., 8:44117
van Holten, Th., Measurement of the Cp-lambda curve of wind turbines under field conditions, 8:43715 (R;NL;In Dutch)
Weight and cost analysis of large wind turbine rotors constructed from conventional materials and from advanced composite materials, 8:43714 (R;NL;In Dutch)
Van Hove, M.A., *See* Koestner, R.J., 8:44353
van Mourik, G.J., Review of energy storage, 8:43968 (R;NL;In Dutch)
van Oostvoorn, F., SO2-, NOx- and dust-emissions in the energy model SELPE: an integrated energy/environmental model, 8:44006 (R;NL;In Dutch)
van Rij, W.I., TEDIT, a computer code for studying the time evolution of drift instabilities in a torus, 8:45146 (R;US)
Van Sant, J.H., *See* Dalder, E.N.C., 8:45262
van Veen, N., *See* Das, P., 8:44882
van Wees, F.G.H., Industrial fuel applications. Furnaces and dryers, 8:44099 (R;NL;In Dutch)
See Boot, A.H., 8:44046, 8:44098
van Zanten, M., Proposed coordinated research program of energy storage in flywheels. Project preparation group 'Flywheels', 8:43970 (R;NL;In Dutch)
Vana, N., Non-destructive technique for qualitative and attribute verification of spent fuel elements. Final report for the period 1 May 1980 - 31 July 1982, 8:43794 (R;XA)
Vance, E.R., *See* Hsu, F.H., 8:44233
Vandegrift, G.F., Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides, 8:43393 (R;US)
Vanderborgh, N.E., *See* Srinivasan, S., 8:44054
Vanderwater, D.A., *See* Brown, J.A., 8:44307
Vane, C.R., *See* Breinig, M., 8:44901
Vanier, P.E., *See* Corderman, R.R., 8:44288
Vaniman, D.T., *See* Crowe, B.M., 8:43356
See Ogard, A.E., 8:43359
Vanni, E.A., *See* Serrano, M.A.B., 8:43919
Varelas, C., Influence of surface contamination on energy distribution of surface channeled ions, 8:44143 (RA;SU)
Vargas-Aburto, C., *See* Cruz, S.A., 8:45051
Varlakhin, V.A., *See* Anashkin, O.P., 8:44377

Varughese, C.K., Ash disposal at super thermal power stations in India, 8:43204 (RA;DK)
Vary, J.P., *See* Cambiaggio, M.C., 8:45032
See Ludeking, L.D., 8:44979
Vashishta, P., *See* Parrinello, M., 8:45076
Vasil'ev, M.A., *See* Cherepin, V.T., 8:44863
Vasilevskij, V.V., *See* Bondarenko, G.G., 8:44154, 8:44277
Vasseur, P., Free convection between horizontal cylinders in water at low temperature, 8:44423 (R;BR)
See Robillard, L., 8:44413
Vastola, F.J., *See* Walker, P.L. Jr., 8:43164
Vater, P., *See* Tress, G., 8:44386
Vaulina, I.G., Equilibrium of the toroidal field winding in tokamaks, 8:45234 (RA;SU;In Russian)
Vavra, P.C., Image-enhancement tools for tracing fringe patterns in holographic interferograms acquired during laser-fusion experiments. KMSF-U-1346, 8:45214 (R;US)
Veber, R., *See* Aleksandrova, I.V., 8:43891
Vehanen, A., *See* Schultz, P.J., 8:44205
Veillaut, J.P., *See* Duchemin, B., 8:43837
Veksler, V.I., *See* Adylov, A.A., 8:44867
Vellozo, S.O., Criticality calculations for safety analysis, 8:44385 (RA;BR;In Portuguese)
See Barroso, D.E.G., 8:43775
See Spiegelberg, R.deS.H., 8:43844
Venezia, R.A., Land use and transportation impact on air quality, 8:43996 (RA;US)
Venhuizen, J.R., PWR small-break analysis using a PDP-11/AD10 computer system, 8:43900 (R;US)
Venkataraman, N.S., Thermal resistance of a convectively cooled plate with applied heat flux and variable internal heat generation, 8:44414 (R;BR)
Venturini, E.L., *See* Dodson, B.W., 8:44351
Verbeek, H., *See* Matschke, F.E.P., 8:44852
Verbiest, E., *See* Reinstema, S.R., 8:44149
Vergnaud, T., *See* Baur, A., 8:43758
Verslvis, S., Special problems in making geotechnical measurements in salt, 8:44820 (J;US)
Verykios, X.E., *See* Whitcraft, D.R., 8:43444
Vetter, J.E., SNQ linac - a technological step towards a fusion driver, 8:44472 (RA;DE)
Vetter, J.R., Economic potential for cleaned coal water slurries: a utility perspective, 8:43260 (RA;US)
Vetterle, J.F., Transfer coefficients for turbulent flow between parallel plates, 8:44425 (R;BR;In Portuguese)
Viallier, P., *See* Donze, J.J., 8:44106
Vickers, D.L., Plotting CV drawings on an electron-beam recorder, 8:45317 (R;US)
Vigeholm, B., Magnesium hydride for load-leveling energy storage. Final report, 8:43420 (R;XE)
Vikhrev, V.V., Program for numerical calculation of the plasma parameters in a tokamak reactor with fast atom beam injection, 8:45105 (R;SU;In Russian)
Vinhas, L.A., *See* Fulfaro, R., 8:43890
Vining, C.B., Low-temperature heat capacity of superconducting ternary iron silicides, 8:44310 (J;US)
Viola, V.E. Jr., *See* Kwiatkowski, K., 8:44989
Vishnyakov, V.V., Determination of beam particle track parameters in experiments on the MIS installation (JINR), 8:44584 (R;SU;In Russian)
Δp/p beam particle determining in the MIS installation (JINR), 8:44590 (R;SU;In Russian)
Vlad, M., *See* Popescu, I.I., 8:45129
Vlasov, V.L., *See* Efanov, A.D., 8:43908
Vlasova, V.N., *See* Efanov, A.D., 8:43908
Vo Van Tkhuan, *See* Borzakov, S.B., 8:44592
Voelskow, M., *See* Grotzschel, R., 8:44274
Voelz, G., *See* Reyes, M., 8:44800
Vogt, J.H., Task 4 completion report for 40-kilowatt grid-connected modification contract, 8:44056 (R;US)
Vogt, S., Sensitivity analysis of the meteorological model applied in the German risk study (DRS), 8:43878 (BA;US)
See Meuren, K., 8:43546
Vojtkovska, I., Low pressure drift chamber in experiment on studies of radiation of relativistic particles in single crystals, 8:44607 (R;SU;In Russian)
Volk, K., *See* Simhan, K., 8:43688
Volkov, Yu.F., Features of arc formation on the limiter with a dielectric film in current discharge, 8:45237 (RA;SU;In Russian)
Vollan, A., Aeroelastic stability and dynamic response analysis of the LDB-125 vertical axis wind turbine, 8:43716 (R;SE)
Vollov, E.D., *See* Volkov, Yu.F., 8:45237
Vollstedt, W., *See* Albrecht, P., 8:43697
Volta, G., Assistance to operators of nuclear power plants in Europe in emergency situations, 8:43955 (BA;US)
von Gertten, E., *See* Hermansson, O., 8:44689
von Goeler, S., *See* Jobes, F., 8:45148
See Stevens, J., 8:45152
Von Linsingen, I., Analysis of the flow close to a hump at the wall of a circular pipe, 8:44907 (R;BR;In Portuguese)
von Moellendorf, U., *See* Kessler, G., 8:45216
von Roos, O., Boundary conditions at grain boundaries, 8:45067 (J;US)
Position-dependent effective masses in semiconductor theory, 8:45069 (J;US)
von Witsch, W., *See* Umland, E., 8:44934
Voorhees, D., *See* Suckewer, S., 8:44400
Vorderwisch, P., *See* Axmann, A., 8:43887
Vorob'ev, V.A., Developing the algorithm and code for calculating an interchannel stability of steam generating channels, 8:43854 (R;SU;In Russian)
Voytko, J.D., Keystone: a viable coal-to-methanol project, 8:43449 (RA;US)
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8:43234 (RA;US)
Vrba, P., Simulation code of relativistic electron beam diodes, 8:45135 (RA;CS)
Vybojshchik, M.A., *See* Krishtal, M.A., 8:44166, 8:44167
Vylov, Ts., *See* Bogomolova, E.S., 8:44364
Vyskochil, S., Application of light pipes with large cross sections for transmission of service data image to the photographic film of a hydrogen chamber, 8:44593 (R;SU;In Russian)

W

Waber, J.T., *See* Kunz, A.B., 8:44318
Wach, W., Range distributions of low-energetic light ions in silicon, 8:45040 (R;DE;In German)
Wadt, W.R., *See* Cohen, J.S., 8:44899
Waetjen, U., *See* Jupe, H., 8:44671
Wagner, B.S., *See* Rosenfeld, A.H., 8:44081
Wagner, P., *See* Peterson, E.J., 8:43306
Wagner, V., Wind situation in overseas countries with regard to utilization of wind power as a means of promoting exports of the German industry, 8:43675 (RA;DE;In German)
Wagner, W., *See* Berger, C., 8:44915
Waide, R.B., Competition between West Indian anoles and birds, 8:44714 (J;US)
Wakatani, M., Phenomenological theory of the anomalous transport in tokamaks, 8:45141 (RA;JP)
See Strauss, H.R., 8:45181
Walbridge, T.A. Jr., First three years of the Department of Energy Grant. Final report, 8:43493 (R;US)
Walker, A.T., *See* Brown, D.J., 8:43339
Walker, B.A., *See* Ames, L.L., 8:44819
Walker, D.J., *See* Harris, S.E., 8:44631
Walker, P.L. Jr., Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8:43164 (R;US)
Walker, W.W., Phase transformation study of n-hexadecanol by positron annihilation, 8:44319 (BA;NL)
Walkiewicz, T.A., Excited states of ^{96}Ru, 8:45005 (J;US)
Wallace, D.C., Ensemble corrections for the molecular-dynamics ensemble, 8:45089 (J;US)
See Holian, B.L., 8:44311
Wallace, J.B., *See* Margaritis, A., 8:43463
Wallin, S., Future energy landscape. Geographic image of the energy bill of 1981, 8:44029 (R;SE;In Swedish)
Wallin, T., *See* Liem, H., 8:43201
Walrath, L.F., *See* Bliem, C.J., 8:43662
Walsh, F., Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios, 8:44324 (R;US)
Walsh, J.L., *See* McGowan, T.F., 8:43431
Walter, G.A., *See* Wortmann, F.X., 8:43698
Walter, J.B., *See* Jones, S.E., 8:45215
Walton, J.J., Preliminary report on the LSDM transport sub-model TRANZAM, 8:44690 (R;US)
Wan, E.I., Economic evaluation of indirect biomass liquefaction processes for production of methanol and gasoline, 8:43456 (BA;US)

Technical and economic assessment of emerging advanced biomass thermochemical conversion techniques, 8:43432 (RA;US)
Wandzilak, P., *See* Drozdowicz, B., 8:44656
Wang, D., *See* Cooper, D.E., 8:45273
Wang, H.Y., Maximizing microbial cell loading in immobilized-cell systems, 8:43462 (J;US)
See Lee, S.S., 8:43469
Wang, J.C., *See* Harris, S.E., 8:44631
Wang, P.C., *See* Hwang, H., 8:43944
Wang, R., Phenomenological study of heterogeneous chemical reactions of mercuric chloride on heated stainless steel surfaces, 8:44336 (J;US)
Wang, S.T., *See* Owen, E.W., 8:45260
Wangen, L.E., *See* Dreesen, D.R., 8:43347
Wangler, T.P., RFQ development at Los Alamos, 8:44483 (RA;DE)
Ward, T.E., *See* Kwiatkowski, K., 8:44989
Ware, A.A., Heat conduction process in tokamak hot-ion plasmas, 8:45102 (R;US)
Ware, A.G., Experimental damping data for dynamic analysis of nuclear power plant piping systems, 8:43904 (R;US)
Nuclear power plant piping damping parametric effects, 8:43907 (R;US)
Use of the modal superposition technique for piping system blowdown analyses, 8:43905 (R;US)
Warming, P., *See* Elsen, E., 8:44917, 8:44918
Warner, B.E., *See* Kushner, M.J., 8:44402
Warner, D.D., Aspects of the finite boson number in the IBA, 8:45028 (R;US)
Average resonance capture studies of / sup 162,164/Dy, 8:45011 (J;US)
See Casten, R.F., 8:45022
Waroquier, M.E.L., Effective Skyrme-type interaction for the calculation of nuclear structures of the whole mass table, 8:45029 (R;BE;In Dutch)
Warren, R.P., Heat flow in a He II-filled fin, 8:44434 (R;US)
Warren-Couch, K., Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8:43148 (R;US)
US Synthetic Fuels Corporation overview, 8:43149 (RA;US)
Warwick, A.I., Aspects of data on the breakup of highly excited nuclei, 8:44931 (R;US)
Breakup of spectator residues in relativistic nuclear collisions, 8:45020 (J;US)
Washburn, J., *See* Mazur, J.H., 8:44283
See Sadana, D.K., 8:44299
Waslenchuk, D.G., Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8:44731 (RA;DK)
Wasserroth, K., *See* Axmann, A., 8:43887
Wastler, L.C., *See* Wirth, G.F., 8:44753
Watanabe, T., Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8:43355 (R;US)
Watkins, L.M., *See* Lepp, R.M., 8:43867
Watkins, N., Design of passive/hybrid solar systems for manufactured metal buildings for commercial and industrial applications, 8:43599 (RA;US)
Watson, H.E., *See* Cullen, W.H., 8:43752, 8:43781
Watson, R.E., Ionic character of polar crystals: An extended Mulliken scheme for electronegativities, 8:45074 (J;US)
Ionic-charge modification at the surface of polar crystals, 8:45073 (J;US)
Watson, R.L., X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8:44838 (R;US)
Watson, V., *See* Gove, N., 8:44001
Watt, D.W., *See* Davis, H.G., 8:43438
Watts, A.W., Wind power activities of the Bureau of Reclamation, 8:43712 (RA;US)
Watts, J.A., *See* Olson, J.S., 8:44710
Watts, K.D., *See* Jones, S.E., 8:45215
Wcislak, L., *See* Drozdowicz, B., 8:44656
Weathers, P.J., *See* Miller, J.E., 8:43465
Webb, G.W., *See* Lim, K.C., 8:44226
Webb, R., *See* Donnelly, S.E., 8:44874
Webb, S.W., *See* Evans, D.G., 8:44429, 8:44430
Webel, G., *See* Ranga Raju, K.G., 8:44433
Weber, G., *See* Elsen, E., 8:44917, 8:44918
Webster, W.C., *See* Donnelly, J.R., 8:43197
Weeren, H.O., *See* Stinton, D.P., 8:43374
Weertman, J.R., Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983, 8:44132 (R;US)
Wehner, E., *See* Pinheiro, R.B., 8:43831
Weidt, J.L., Passive solar bank building in Minnesota, 8:43608 (RA;US)
Weigold, E., *See* Frost, L., 8:44839
Weiguny, A., *See* Cassing, W., 8:45030
Weik, F., *See* Warwick, A.I., 8:44931
Weiland, T., *See* Bane, K., 8:44505, 8:44506
Weimar, P., *See* Kummerer, K., 8:43809
Weinberg, C., Photovoltaic status assessment: utility perspective , 8:43499 (RA;US)
Weinhold, S.A., Julich Nuclear Researh Institute annual report, 1980/81, 8:43835 (R;DE;GE)
Weiser, G., *See* Yona, S., 8:44621
Weisman, J., Nuclear-fuel-cycle education: Module 4. Fuel element design, 8:43746 (R;US)
Welch, J.M., *See* Nielson, R.M., 8:43354
Weller, H.R., *See* Woodworth, J.G., 8:44977
Welsh, J.E., *See* Norton, W.W., 8:43180
Weng, S.L., *See* Eberhardt, W., 8:44896
Wensierski, P., *See* Giess, B., 8:43686
Wenzel, R.G., *See* Carlsten, J.L., 8:44399
Werner, W., *See* Tress, G., 8:44386
Wernette, D.R., *See* Santini, D.J., 8:44652
Weseman, M., Training Kentuckians for industrial jobs: a longitudinal study, 8:45287 (R;US)
Wesner, D., *See* Eberhardt, W., 8:44896
Wessels, B.W., *See* Christianson, K.A., 8:44290
West, G.B., General infrared and ultraviolet troperties of the gluon propagator in the axial gauge, 8:44939 (J;US)
West, R.N., *See* Alam, A., 8:44229
Wester, D.W., Synthesis and characterization of bis(μ-hydroxo)tetraaquadiplutonium(IV) sulfate, $Pu_2(OH)_2(SO_4)_2.4H_2O$, a novel compound containing hydrolyzed plutonium (IV), 8:44367 (J;US)
Westerberg, G., Proposals for acoustical requirements of the heating and power industry, 8:44812 (R;SE;In Swedish)
Westergaard, R.H., Well control in case of offshore blowout. Diversion, 8:43278 (R;NO)
Well control in case of offshore blowout. Oil collection on platforms, 8:43279 (R;NO)
Well control in case of offshore blowout. Mechanized drill pipe handling, stabbing, stripping/ snubbing, drill string telemetry and mud monitoring, better BOP, 8:43280 (R;NO)
Well control in case of offshore blowout. Well killing-final control-after shut-in in relation to the various control methods, 8:43281 (R;NO)
Well control in case of offshore blowout. Capping on the sea floor, blowout risk of subsea oil production, 8:43282 (R;NO)
Wethington, J.A., Nuclear-fuel-cycle education: Module 10. Environmental consideration, 8:43394 (R;US)
Wethington, J.A. Jr., *See* Dalton, G.R., 8:43329
Wettlaufer, R., *See* Drews, P., 8:43696
Whan, R.E., Microstructural characterization of simulated reactor waste forms, 8:43381 (R;US)
Wheatley, J., Intrinsically irreversible thermoacoustic heat engine, 8:44436 (J;US)
Wheelwright, E.J., Generation and vitrification of high-level light water reactor liquid waste, 8:43391 (J;US)
Whiddon, W.I., *See* Gordon, H.T., 8:43593
Whitcraft, D.R., Catalytic conversion of fermentation derived ethanol to gasoline, 8:43444 (J;US)
White, D.H., Advanced laboratory-scale extruder-reactor biomass liquefaction unit, 8:43436 (RA;US)
White, G.C., *See* Gilbert, R.O., 8:45308
White, M.C., Radioactive material transport, 8:44374 (R;CA)
White, M.K., *See* Burnham, J.B., 8:43813
White, R.J., *See* Appelhans, A.D., 8:43747
White, T.L., ORNL 28-GHz user experience, 8:45201 (RA;US)
Whitmore, P.M., Distance dependence of electronic energy transfer to semiconductor surfaces: $^3n\pi$ /sup / pyrazine/GaAs(110), 8:44306 (J;US)
Whittaker, J., Neutron-proton bremsstrahlung at 4.8 MeV, 8:45058 (B;ZA)
Whitton, L.L., *See* Tanovic, L.A., 8:44142
Wick, O.J., Background radioactivity from natural occurrences: a preliminary review, 8:44717 (R;US)
Wiczer, J.J., Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8:44315 (J;US)
Wiedmann, W., *See* Pontow, B., 8:43146
Wieling, N., *See* Gerscha, A., 8:43753
Wieman, H.H., *See* Warwick, A.I., 8:44931, 8:45020

Wiese, W.L., Determine atomic data pertinent to the magnetic-fusion-energy program for one-half of FY 1984, 8:45103 (R;US)
Wilbur, C.K., *See* Vandegrift, G.F., 8:43393
Wild, J.F., *See* Meyer, R.A., 8:45001
Wilfert, G.L., *See* Franklin, A.L., 8:44085
Wilgusiewicz, Wl., *See* Kmiecik, J., 8:43209
Wilkins, B.D., *See* Warwick, A.I., 8:44931
Wilkinson, F.J. III, *See* Jensen, R.T., 8:43377
Wilkinson, G., *See* Reyes, M., 8:44800
Wilkinson, R., *See* Bateman, J.E., 8:44777
Williams, C.W., *See* Morss, L.R., 8:44338
Williams, G.P., *See* El-Batanouny, M., 8:44217
Williams, J.M., *See* Dreesen, D.R., 8:43347, 8:43348
Williams, J.S., *See* Tanovic, L.A., 8:44142
Williams, M.B., *See* Bishop, A.R., 8:45086
Willison, J.R., *See* Harris, S.E., 8:44631
Wilms, I., Measurement procedure for acquisition of spatial inhomogeneous aerosol concentrations, 8:44673 (RA;DE)
Wilhuhn, K., *See* Gladitz, J., 8:43411, 8:43412
Wilmot, E.L., *See* Luna, R.E., 8:43334
See Madsen, M.M., 8:43335, 8:43336
Wilson, C.L., *See* Russcher, G.E., 8:43937
Wilson, C.R., Geohydrological data from the macropermeability experiment at Stripa, Sweden, 8:44818 (R;US)
Wilson, J.R., *See* Smith, M.D., 8:44832
Wilson, P.B., Threshold current for the transverse single-bunch instability in PEP, 8:44502 (R;US)
Wilson, S.J., Passive and hybrid solar manufactured housing and buildings, 8:43564 (RA;US)
Wilt, M.J., Electromagnetic soundings over a geothermal reservoir in Dixie Valley, Nevada, 8:43656 (R;US)
Winkle, J., Effect of some radioprotective and radiosensitizing substances on the semiconservative and unscheduled DNA biosynthesis of rat thymocytes, 8:44797 (R;DE;In German)
Winklepleck, G., *See* Kirshenbaum, N., 8:43448
Winkler, G., *See* Lienhard, H., 8:43231
Winn, J.S., *See* Horak, D.V., 8:44357
Winn, W.G., Tritiated-water detection with a $^{2}D(\gamma,n)^{1}H$ monitor, 8:44569 (R;US)
Winter, S., Passive solar construction handbook, 8:43636 (RA;US)
Winters, R.R., *See* Johnson, C.H., 8:44990
Winther, A., *See* Esbensenm, H., 8:45037
Wire, M.S., Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al₂ alloy, 8:44213 (J;US)
Wiringa, R.B., *See* Coester, F., 8:44969
Wirth, G.F., National water quality control information system (STORET), 8:44753 (RA;US)
Wise, H., *See* Wood, B.J., 8:43170
Witherspoon, J.P., *See* Ryan, M.T., 8:44706
Witmer, F.E., Environmental pollution control research activities, 8:43226 (RA;US)
Witt, H., Construction and operation of the large wind power plant GROWIAN I, 8:43689 (RA;DE;In German)
Development and testing of heat generating wind power plants for heating of buildings, 8:43687 (RA;DE;In German)
Witte, A.B., *See* Gat, N., 8:43161
Wobber, F.J., *See* Gehrs, C.W., 8:43263
Woelk, G., Minimizing the energy consumption of industrial furnaces during the heating process by controlling the furnaces using reliable mathematical models and by optimizing necessary cooled supports, 8:44092 (R;DE;In German)
Woffinden, G.J., *See* Markowski, G.R., 8:43213
Wognar, M., *See* Belov, A.G., 8:44547
Wold, M., *See* Langfeldt, J.N., 8:43287
Wolf, L., Quantitative determination of phosphorous and hypophosphorous acid, 8:44333 (TJ;US)
Wolfe, D.M., *See* Denes, P., 8:44986
Wolff-Fischer, E., *See* Kuehn, L., 8:43190
Wollenberg, H., Petrology and radiogeology of the Stripa pluton, 8:44817 (R;US)
Wollman, S., *See* Strauss, H.R., 8:45181
Wollnik, H., Final focusing concepts in the HIBALL study, 8:44526 (RA;DE)
Wolowski, E., *See* Langhoff, J., 8:43155
Wong, H.K.T., *See* Borgida, A., 8:45320
Wong, K.L., Echo phenomenon associated with lower-hybrid-wave launching, 8:45150 (R;US)
Woo, K.C., Experimental phase diagram of lithium-intercalated graphite, 8:44258 (J;US)
Wood, B.J., Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8:43170 (R;US)
Wood, D.C., Using event trees to quantify the effect of post-TMI modifications on PORV-related LOCA probability, 8:43826 (BA;US)
Wood, R.A., *See* DeDuck, P.F., 8:43641
Woodhead, P.M.J., *See* Donnelly, J.R., 8:43197
See Parker, J.H., 8:43196
Woodruff, E.M., *See* Divine, J.R., 8:43756
Woodworth, J.G., Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8:44977 (R;US)
See Pywell, R.E., 8:44993
Woolf, L.D., Investigation of the occurrence of superconductivity below the antiferromagnetic transition in Ho(Ir/sub 0.7/Rh/sub 0.3/)$_4$B$_4$, 8:44249 (J;US)
Woolfenden, G.E., Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts, 8:43286 (R;US)
Worku, G., *See* Cox, T.E., 8:43910
Wortmann, F.X., Setting up a gust generator for the development of wind turbines, 8:43698 (RA;DE;In German)
Wouters, J.M., Beta-decay energies and masses of $^{103-105}$In, 8:45006 (J;US)
Wray, W.O., Study of the effectiveness of selective absorber coatings and phase change materials in passive solar space heating, 8:43628 (RA;US)
Wright, J.D., Algebraic description of perturbation theory in quantum electrodynamics, 8:44949 (R;AU)
High-temperature acid hydrolysis of cellulose for alcohol fuel production, 8:43454 (R;US)
Wright, K.E., *See* Tasoulias, G.W., 8:45275
Wright, R.B., *See* Pellin, M.J., 8:45198
Wrixon, G.T., *See* McEvoy, A.J., 8:43500
Wrobel, T.F., *See* Ochoa, A. Jr., 8:44627
Wu, Y.S., *See* Chang, C.H., 8:44960
See Chau, L.L., 8:44961
Wuebbles, D.J., Theoretical analysis of the past variations in global atmospheric composition and temperature structure, 8:44692 (R;US)
Wyant, R.E., *See* Hillman, M., 8:43451
Wynveen, R.A., Formerly utilized MED/AEC sites remedial action progam. Radiological survey of the Albany Metallurgical Research Center, United States Bureau of Mines, Biomass Facility and the Back Forty Area, Albany, Oregon, 8:44697 (R;US)

Y

Yaakobi, B., *See* Burek, A.J., 8:45213
Yabe, T., *See* Nishiguchi, A., 8:45111
Yafasov, A.Ya., *See* Bukki, S.M., 8:44616
Yalovoj, I.N., *See* Zabolotin, V.P., 8:44495
Yamaki, T., Final beam transport in the reactor chamber, 8:45239 (RA;JP)
Yamamoto, K., *See* Miyahara, A., 8:45217
Yamamoto, M., Quantitative compositional analysis and field-evaporation behavior of ordered Ni$_4$Mo on an atomic plane-by-plane basis: an atom-probe field-ion microscope study. MSC report No. 4802, 8:44130 (R;US)
See Takatsu, H., 8:45266
Yamanaka, C., *See* Sakabe, S., 8:45228
Yang, C.C., *See* Smith, M.R., 8:43157
Yang, C.H., *See* Berlad, A.L., 8:43935
Yang, Chuande, Scattering anisotropy and neutron leakage in a reactor lattice, 8:43838 (R;FR;In French)
Yang, K.N., Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8:44242 (R;US)
Yano, K., *See* Sakamoto, Y., 8:45251
Yanson, R., *See* Slapa, M., 8:44615
Yarberry, V.R., Metacad programmer's guide, 8:45310 (R;US)
Yaroshevich, V.D., *See* Fabritsiev, S.A., 8:44161
Yasa, Z.A., Analysis of mode locking by synchronous pumping of a gain medium with long decay time, 8:44405 (J;US)
Yasi, J., *See* Baker, B., 8:44055
Yates, R.A., *See* Busche, R.M., 8:43523
Yen, J.H., *See* Li, K., 8:43163
Yin, M.T., Valence-electron density in silicon under high pressure, 8:44305 (J;US)
Yntema, J.L., *See* Bhat, C.M., 8:44999
Yona, S., Fading and buildup in TLD-100 cards used for personal dosimetry, 8:44621 (R;IL;In Hebrew)
Yorke, J.A., *See* Grebogi, C., 8:45094
Yoshizawa, A.H., *See* Birgeneau, R.J., 8:44293
Young, C.E., *See* Pellin, M.J., 8:45198

Young, D.A., Effect of CTBN composition on the properties of clear and filled epoxy adducts, 8:44450 (R;US)
See Ross, M., 8:44199
Young, J.C., Operational characteristics of anaerobic packed-bed reactors, 8:43445 (J;US)
Young, J.F., *See* Harris, S.E., 8:44631
Young, J.P., *See* Ensor, D.D., 8:44330
Young, R.C., *See* Ruane, R.J., 8:43211
Yrisarri, E. Jr., Commercialization of the power-factor controller. Final report, 8:44076 (R;US)
Yudin, K.I., *See* Polivanov, I.F., 8:43850
Yue, A.S., Semiconductor eutectics for energy conversion. Final report, 8:43511 (R;US)
Yur'ev, Yu.S., *See* Efanov, A.D., 8:43908
See Kanukhina, S.V., 8:43862
Yurasova, V.E., *See* Shelyakin, L.B., 8:44857

Z

Zabolotin, V.P., Position of the magnetic median surface in the magnet of the JINR synchrophasotron, 8:44495 (R;SU;In Russian)
Zaborowski, H.L., Project "REMAD", Neutron spectrometry. Code "SOHO - phase II". First part "FORMULATION", 8:44565 (R;FR;In French)
Zabransky, B.J., *See* Vager, Z., 8:44902
Zacek, F., *See* Datlov, J., 8:45117, 8:45242
See Stoeckel, J., 8:45122
Zachos, C.K., *See* Bitar, K.M., 8:44963
Zagryadskii, V.A., *See* Aleksandrov, V.D., 8:45056
Zagury, N., *See* Amaral, M.G.D., 8:44933
Zaininger, H.W., Investigate alternative interconnection strategies for arrays of wind-turbine generators. Final report, 8:43718 (R;US)
Zajac, G., Comment on "spin-polarized Auger spectroscopy from magnetically ordered solids", 8:44329 (J;US)
Line-shape analyses of XVV Auger spectra of p(1 x 1)-$V_3Si(00)$: Evidence for autoionization emission, 8:44206 (J;US)
See Bader, S.D., 8:44893
See Hamaker, H.C., 8:44246
Zajic, V., Direct measurement of physical and chemical parameters in reactor circuits at high pressure and temperature of water, 8:43768 (RA;CS;In Czech)
Zajmidoroga, O.A., Optical constants of magnetic spark spectrometer, 8:44581 (R;SU;In Russian)
Zak, J., *See* Bader, S.D., 8:44893
See Zajac, G., 8:44206, 8:44329
Zaksk, A., *See* Morgan, D.T., 8:44104
Zakharov, L.E., *See* Goedbloed, J.P., 8:45153
Zaleski, I., *See* Baluka, G., 8:44595
Zaletin, V.M., X-radiation and soft gamma radiation detectors on the base of HgJ_2 crystals, 8:44617 (RA;SU;In Russian)
See Golenetskij, S.P., 8:44613
Zamrij, V.N., *See* Zhuravlev, V.V., 8:44539
Zanevskij, Yu.V., *See* Abdushukurov, D.A., 8:44591
Zangwill, A., *See* Eberhardt, W., 8:44210
Zaplatin, N.L., Magnetic system for investigation of the orbit expansion effect on the electron model of a ring cyclotron, 8:44477 (R;SU;In Russian)
See Glazov, A.A., 8:44494
Zardecki, A., Application of the 2-D discrete-ordinates method to multiple scattering of laser radiation, 8:44694 (J;US)
Zarifian, E., *See* Baron, J.C., 8:44763
Zasadzinski, J., *See* Gray, K.E., 8:44250
Zastavenko, L.G., About one Newell's result and the quantum mechanical check of the microcanonical distribution, 8:45081 (R;XJ)
Zaveryukhin, V.N., *See* Bukki, S.M., 8:44616
Zead, M.E., NRL megawatt gyrotron program. Status review, 8:45210 (RA;US)
Zee, T.I.S.Y., Influence of oxygen on segregation of chromium at structural damage in gallium arsenide, 8:44282 (R;US)
Zel'dovich, A.G., *See* D'yachkov, E.I., 8:44536
See Golovanov, L.B., 8:44387
Zelck, G., Wind energy converter with high-speed vertical axis rotor and straight rotor blades, 8:43680 (R;DE;In German)
Zeliger, K., *See* Budzyak, A., 8:44587
Zengerle, R., Making use of wind energy: a course in evaluating and choosing sites for small wind machines, 8:43719 (R;US)
Zernin, Yu.D., *See* Vyskochil, S., 8:44593
Zhabrev, G.I., *See* Ajnetdinov, E.B., 8:44855
Zhargal, Ch., Coaxial detectors from superpure germanium, 8:44596 (R;SU;In Russian)
Zhdan, G.T., *See* Ibragimov, Sh.Sh., 8:44158
Zhelenskij, V.F., Study of radiation damage in nuclear- and thermonuclear materials using accelerators, 8:44162 (RA;SU;In Russian)
Zhidkov, E.P., *See* Bakhvalov, N.S., 8:44500
See Dolya, S.N., 8:44549
Zhidkov, N.K., Using heat pipes for cooling detectors and preamplifiers inside the vacuum chamber of the accelerator in a spectrometer of recoil nuclei, 8:44586 (R;SU;In Russian)
Zhil'tsov, V.A., *See* Arsenin, V.V., 8:45106
Zhmodikov, B.S., *See* Babalin, A.I., 8:45231
Zhou, B.R., *See* Chang, C.H., 8:44960
Zhou, S.H., *See* Kwiatkowski, K., 8:44989
Zhuang, G.Y., *See* Vager, Z., 8:44902
Zhukov, A.I., *See* Gann, V.V., 8:45046
Zhukov, A.V., Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing, 8:43803 (R;SU;In Russian)
Zhuravlev, V.V., Automation of measurements, parameter correction and control of the LIU-30 accelerator, 8:44539 (R;SU;In Russian)
Zichichi, A., Multiparticle hadronic systems produced in high-energy (pp) interactions, and comparison with (e^+e^-), 8:44913 (R;CH)
Ziegler, E.J., *See* Allen, R.E., 8:43828
Zima, G.E., *See* Divine, J.R., 8:43756
Zimin, G.N., *See* Baluka, G., 8:44595
Zimmerman, R.M., Geotechnical instrumentation requirements for atdepth testing and repository monitoring in tuff, 8:43388 (J;US)
Zimmermann, H., Controlled ventilation with heat recovery for residential buildings, 8:44067 (R;DE;In German)
Zin'kevich, S.P., *See* Bogomolova, E.S., 8:44364
Zinov, V.G., *See* Bystritskij, V.M., 8:44544
Zinov'eva, O.G., *See* Vajsfel'd, A.M., 8:44611
Zlock, K.O.H., *See* Liebowitz, D., 8:44924
Zlokazov, V.B., ACTIV-computer code for automatic processing of γ-ray spectra, 8:45298 (R;SU;In Russian)
Zolotarev, K.I., *See* Bychkov, V.M., 8:44995
Zorin, E.I., *See* Pavlov, P.V., 8:44272
Zrelov, V.P., Measurements of the mean energy of proton beam (approximately 1 GeV) extracted from the LINF synchrocyclotron using the Cherenkov method of double reflections, 8:44542 (R;SU;In Russian)
Zuhr, R.A., *See* Feldman, L.C., 8:44856
Zumino, B., *See* Gaillard, M.K., 8:44957
Zurawsky, W.P., Pressure induced conduction and valence band shifts in InP and GaAs from measurements at semiconductor—electrolyte interfaces, 8:44297 (J;US)
Zyukin, A.G., *See* Bokov, M.A., 8:44556

SUBJECT INDEX

The subject index is based on the use of subject descriptors selected from a controlled thesaurus of terms (DOE/TIC-7000). Subject descriptors and qualifiers (subheadings) are selected and presented in the following format:

SUBJECT DESCRIPTOR
Qualifier
Title, (supplementary information), citation number, (R:US)

The notations in the final parentheses indicate the type of document, e.g., R for Report; the country of publication, e.g., US; and the language if other than English, e.g., In German. Tables of document types and country of publication codes appear after the indexes.

The title may be supplemented with additional words, or a phrase, if it appears additional information would be helpful. In cases for which the title contains little or no information related to the subject entry, it may be replaced entirely by the supplementary information. A qualifier is not always required, and in such cases the title will follow the unqualified subject descriptor.

The descriptors selected for use as subject terms are generally the names of specific materials, things, or processes. To the extent possible, a qualifier is selected to describe the properties of, or processses applied to, the subject term.

Index entries are selected to indicate the important ideas and concepts presented in a document, rather than words that may appear in the text. Within the available thesaurus terms, the most probable or logical place to look for typical information is selected. "See references" are included to guide users from synonymous terms or phrases to the descriptor selected as a subject heading for the concept. (e.g. Pipeline Quality Gas see HIGH BTU GAS). "See also references" are used to indicate where to find references to subject concepts that are narrower, broader, or related to a particular subject heading. To complete an exhaustive search of a given subject, all such headings should be reviewed. Copies of DOE/TIC-7000, the Subject Thesaurus, are available from the National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, VA 22161.

A

A RESONANCES
For A3 resonances use PI-1640 RESONANCES.
Wave Functions
Influence of nucleon internal degrees of freedom on the strength of electric giant resonances at low energies, 8: 45038 (J:US)

ABDOMEN
Scintiscanning
Indium-111 labelled leucocyte scintigraphy in the diagnosis of inflammatory disease. A clinical study, 8: 44769 (R:NL)

ABSORBED DOSES
See RADIATION DOSES

ABSORBED FRACTION (INTERNAL IRRADIATION)
See INTERNAL IRRADIATION

ABU DHABI
See UNITED ARAB EMIRATES

ACCELERATORS
See also COLLECTIVE ACCELERATORS
HEAVY ION ACCELERATORS
LINEAR ACCELERATORS
MESON FACTORIES
Breakdown
Electric strength and probability of breakdown of high-voltage insulation of nanosecond accelerators, 8: 44478 (R:SU:In Russian)

ACCELEROMETERS
Performance Testing
Systems approach to measuring short-duration acceleration transients, 8: 44641 (R:US)

ACES
See QUARKS

ACETIC ACID
Production
Acidogenic bioconversion of C_1 compounds, 8: 43522 (J:US)
Recovery of acetic acid from dilute acetate solution, 8: 43523 (J:US)

ACETONE
Excitation
Site-specific fragmentation of small molecules following soft—x-ray excitation, 8: 44896 (J:US)
Fragmentation
Site-specific fragmentation of small molecules following soft—x-ray excitation, 8: 44896 (J:US)

ACETYLENE
Molecular Structure
Molecular structure of hydrocarbon monolayers on metal surfaces, 8: 44353 (J:US)

ACID RAIN
Biological Effects
Biological effects of acidity in precipitation on vegetation: a review, 8: 44811 (J:GB)
Environmental Effects
Acid rain, catchment chracteristics and fishery status, 8: 44732 (RA:DK)
Fishery status and water quality in areas affected by acid deposition, 8: 44734 (RA:DK)
Historical changes in acid precipitation and heavy metals deposition originating from fossil fuel combustion in Eastern North America as revealed by Lake Sediment geochemistry, 8: 44736 (RA:DK)
Timing of acidification-induced biological changes in lakes and the relationship to predator-prey interactions, 8: 44733 (RA:DK)
Predator-Prey Interactions
Timing of acidification-induced biological changes in lakes and the relationship to predator-prey interactions, 8: 44733 (RA:DK)

ACIDS (ORGANIC)
See ORGANIC ACIDS

ACRYLAMIDE
Chemical Reactions
Post-shock chemical and ESR analysis of acrylamide and selected anthracene derivatives, 8: 44351 (R:US)

ACTINIDE COMPLEXES
Fluorides
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B:DE:In German)

ACTIVATION ANALYSIS
In Vivo
Neutron-activation analysis in vivo, 8: 44776 (R:US)

ADAPTED SWIMMING POOL REACTOR AUSTRIA
See ASTRA REACTOR

ADDUCTS
Mechanical Properties
Effect of CTBN composition on the properties of clear and filled epoxy adducts, 8: 44450 (R:US)

ADENOCARCINOMAS
See CARCINOMAS

ADGEZATOR
See ELECTRON-RING ACCELERATORS

ADRIAMYCIN
See DOXORUBICIN
ADSORBENTS
Performance Testing
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983 (Cobalt aluminate and manganese oxide), 8: 43173 (R:US)
ADVANCED TEST IDAHO REACTOR
See ATR REACTOR
AERIAL MONITORING
Mathematical Models
Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department, 8: 43881 (BA:US)
AEROSOL GENERATORS
Construction
Aerosol generator for monodisperse Ag- and NaCl-aerosols in the particle size range between 2 nm and 300 nm, 8: 44676 (RA:DE)
Commissioning of a commercially available vibrating office aerosol generator, 8: 44678 (RA:DE)
Development of techniques for the preparation of monodisperse solid ferric oxide particles using the May spinning-top aerosol generator, 8: 44677 (RA:DE)
AEROSOL MONITORING
Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling, 8: 44675 (RA:DE)
Development of a system for the measurement of contamination by plutonium: captor and RC signal post for plutonium and other transuranium elements aerosols, 8: 44562 (R:FR:In French)
Accuracy
Measurement procedure for acquisition of spatial inhomogeneous aerosol concentrations, 8: 44673 (RA:DE)
Cascade Impactors
Equivalence of low pressure impactor and differential mobility analyzer data for submicron particle size distributions, 8: 44635 (RA:DE)
Particle Size
Investigation to the separation efficiency of a cyclone separator using a stray light particle size counting technique, 8: 44672 (RA:DE:In German)
Particle Size Classifiers
Real-time aerodynamic particle size analyzer, 8: 44636 (RA:DE)
PIXE Analysis
Time sequential sampling and elemental analysis of indoor and outdoor aerosol, 8: 44671 (RA:DE)
Spectroscopy
Aerosol measurement by photon correlation spectroscopy, 8: 44674 (RA:DE)
AEROSOLS
See also RADIOACTIVE AEROSOLS
Agglomeration
Agglomeration of welding smoke: a comparison between experiments and theoretical calculation of welding-smoke agglomeration speed, 8: 44695 (TG:US)
Chemical Analysis
Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling, 8: 44675 (RA:DE)
Diffusion
Direct measurements of aerosol diffusion constants in the intermediate Knudsen regime, 8: 44909 (J:US)
Flocculation
Data reduction for aerosol coagulation experiments with wall loss. Topical report No. 1, 8: 44664 (R:US)
Light Scattering
Application of the 2-D discrete-ordinates method to multiple scattering of laser radiation, 8: 44694 (J:US)
Light Transmission
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)
Measuring Methods
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)
Multiple Scattering
Application of the 2-D discrete-ordinates method to multiple scattering of laser radiation, 8: 44694 (J:US)
Opacity
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)
Radiation Transport
Application of the 2-D discrete-ordinates method to multiple scattering of laser radiation, 8: 44694 (J:US)
Surface Coating
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)
AFTER-HEAT
Computer Calculations
Decay heat calculations with the CEA radioactivity data bank and the code PEPIN, 8: 43837 (R:FR:In French)
AGRICULTURAL RESIDUES
See AGRICULTURAL WASTES
AGRICULTURAL WASTES
See also MANURES
Anaerobic Digestion
Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8: 43439 (R:US)
Combustion
Fluidized-bed energy technology for biomass conversion, 8: 43443 (J:US)
Gasification
Support research for biomass thermal-gasification development, 8: 43422 (R:US)
Liquefaction
Fluidized-bed energy technology for biomass conversion, 8: 43443 (J:US)
AIR POLLUTION
Environmental standards, 8: 43993 (RA:US)
Aerosol Monitoring
New approach to the determination of atmospheric strong acids, 8: 44670 (RA:DE)
Corrosive Effects
Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content, 8: 44173 (R:NO)
Economic Impact
Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content, 8: 44173 (R:NO)
Environmental Transport
Preliminary report on the LSDM transport sub-model TRANZAM, 8: 44690 (R:US)
Workshop reports, 8: 44004 (RA:US)
Ions
Natural ion concentration in air as an indication of atmosphere pollution by nanometer aerosol particle, 8: 44656 (RA:DE)
Mathematical Models
Trajectory model with varying mixing height, 8: 44680 (R:DK:In Danish)
Standards
Inorganic-arsenic emissions from glass-manufacturing plants: background information for proposed standards, 8: 44755 (R:US)
AIR POLLUTION CONTROL
Use this term for items that involve the removal or management of pollutants after they are formed by a source.
Cost
Fuel quality/processing study. Volume IV. On-site processing studies, 8: 43177 (R:US)
Planning
Atmospheric modeling and environmental protection needs, 8: 44655 (RA:US)

AIR POLLUTION MONITORS
Technology Assessment
Monitoring equipment. I. Survey of air monitoring instrumentation, 8: 44660 (RA:US)
AIR QUALITY
Environmental Policy
Land use and transportation impact on air quality, 8: 43996 (RA:US)
Information Systems
National Air Data Branch: NEDS/SAROAD, 8: 44709 (RA:US)
Mathematical Models
Status of air quality simulation modeling, 8: 44654 (RA:US)
Monitoring
National Air Data Branch: NEDS/SAROAD, 8: 44709 (RA:US)
AIR SOURCE HEAT PUMPS
Heat Exchangers
Frosting and defrosting behaviour of outdoor coils of air-source heat pumps. Final report, figures, 8: 44078 (R:XE)
Ice
Frosting and defrosting behaviour of outdoor coils of air-source heat pumps. Final report, figures, 8: 44078 (R:XE)
AIRBORNE PARTICLES
See PARTICULATES
AIRBORNE PARTICULATES
See PARTICULATES
AIRCRAFT FUELS
See AVIATION FUELS
AIRPORTS
Direct Gain Systems
Walker Field passive solar heating system, 8: 43610 (RA:US)
Photovoltaic Power Supplies
Airport solar photovoltaic concentrator, Phase III. Project status report No. ASPCP III-4, 1 February 1983-30 April 1983, 8: 43529 (R:US)
Skylights
Walker Field passive solar heating system, 8: 43610 (RA:US)
AJMAN
See UNITED ARAB EMIRATES
ALAP
See RADIATION PROTECTION
ALASKA
Coal Deposits
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
ALCATOR DEVICE
X-Ray Spectra
High-resolution x-ray spectra from molybdenum ions in the Alcator-C tokamak, 8: 44892 (J:US)
ALCOHOL FUELS
Use for pure alcohols, alcohol-water mixtures, or alcohols with additives; for alcohol-gasoline mixtures, use GASOHOL.
See also ETHANOL FUELS
Research Programs
Alcohol fuels activities at the Solar Energy Research Institute, 1982 (Program Summary), 8: 44052 (R:US)
ALCOHOLS
See also ETHANOL
GLYCEROL
METHANOL
PROPANOLS
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
Phase Transformations
Phase transformation study of n-hexadecanol by positron annihilation, 8: 44319 (BA:NL)
ALFVEN WAVES
Resonance Absorption
Observation of spatial alfven resonance, 8: 45138 (R:JP)
ALGEBRA
Bibliographies
KWIC Index for Numerical Linear Algebra, 8: 45305 (R:US)
Indexes
KWIC Index for Numerical Linear Algebra, 8: 45305 (R:US)
ALKALI METAL COMPOUNDS
See also POTASSIUM COMPOUNDS
SODIUM COMPOUNDS
Corrosive Effects
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
ALKYL RADICALS
Chemical Reactions
Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8: 44659 (R:US)
ALKYLATES
See ALCOHOLS
ALLIUM CEPA
Sensitivity
Chromosome aberration assays in Allium, 8: 44810 (J:NL)
ALLOY-HD-8077
See NICKEL BASE ALLOYS
ALLOY-HT-9
Chemical Composition
Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9, 8: 43802 (R:US)
Hardness
Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9, 8: 43801 (R:US)
Heat Treatments
Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9, 8: 43802 (R:US)
Impact Strength
Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9, 8: 43801 (R:US)
ALLOY-MA-754
See NICKEL BASE ALLOYS
ALLOY-MA-956
See IRON BASE ALLOYS
ALLOYS
See also ALUMINIUM ALLOYS
BORON ALLOYS
CHROMIUM ALLOYS
COPPER ALLOYS
INTERMETALLIC COMPOUNDS
MANGANESE ALLOYS
MOLYBDENUM ALLOYS
NICKEL ALLOYS
NIOBIUM ALLOYS
PHOSPHORUS ADDITIONS
RHENIUM ALLOYS
SILICON ALLOYS
SILVER ALLOYS
TANTALUM ALLOYS
TITANIUM ALLOYS
TUNGSTEN ALLOYS
VANADIUM ALLOYS
ZIRCONIUM ALLOYS
Ion Emission
Secondary ion emission from concentrated alloys and compounds, 8: 44863 (RA:SU:In Russian)
Sputtering
Secondary ion emission from concentrated alloys and compounds, 8: 44863 (RA:SU:In Russian)
ALLOY-WAZ-16
See NICKEL BASE ALLOYS
ALPHA REACTIONS
Capture
Alpha capture into the giant quadrupole resonance in ^{28}Si, 8: 44992 (J:US)
Cross Sections
Charged particle reaction cross sections and nucleosynthesis, 8: 44827 (R:AU)
Fragmentation
Breakup of spectator residues in relativistic nuclear collisions, 8: 45020 (J:US)
ALPHA SPECTROSCOPY
Semiconductor Detectors
Amplitude spectra formation in the GaAs radiation detectors, 8: 44616 (RA:SU:In Russian)

ALPHA-BEARING WASTES
Data Compilation
Characteristics of transuranic waste at Department of Energy sites, 8: 43377 (R:US)
Forecasting
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Information Systems
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Inspection
Automated NDT techniques in radioactive waste management, 8: 43353 (R:US)
Inventories
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Packaging
Transportation packaging for processed transuranic waste, 8: 43333 (R:US)
ALTERNATE FUELS
See SYNTHETIC FUELS
ALUMINIA
See ALUMINIUM OXIDES
ALUMINIUM
Ablation
Evidence for plasma jet formation in long-pulse laser irradiation of thin planar Al targets, 8: 44208 (J:US)
Charged-Particle Transport
Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8: 45041 (RA:DE)
Crystal Defects
Electron and positron response to atomic defects in solids: A theoretical study of the monovacancy and divacancy in aluminum, 8: 44216 (J:US)
Study of point defects by channeling measurements of solute atom displacements, 8: 44147 (RA:SU)
Crystal Structure
Calculation of high-pressure phases of Al, 8: 44211 (J:US)
Crystal-Phase Transformations
Calculation of high-pressure phases of Al, 8: 44211 (J:US)
Dislocations
Dechanneling by extended defects, 8: 44148 (RA:SU)
Electric Conductivity
Properties of hot expanded liquid aluminum, 8: 44200 (R:US)
Electron Emission
Theory of the secondary electron emission from Al by high energy proton or α-particle bombardment, 8: 44146 (RA:SU)
Impact Tests
Intermediate velocity penetration of steel spheres into deep aluminum targets, 8: 44195 (R:US)
Impurities
Electric field gradient of single impurities in aluminum, 8: 44220 (J:US)
Ion Collisions
Theory of the secondary electron emission from Al by high energy proton or α-particle bombardment, 8: 44146 (RA:SU)
Optical Properties
Void lattice effect on the optical properties of metals, 8: 44156 (RA:SU:In Russian)
Physical Radiation Effects
Study of point defects by channeling measurements of solute atom displacements, 8: 44147 (RA:SU)
Porosity
Void lattice effect on the optical properties of metals, 8: 44156 (RA:SU:In Russian)
Secondary Emission
Theory of the secondary electron emission from Al by high energy proton or α-particle bombardment, 8: 44146 (RA:SU)
Surface Properties
Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8: 44144 (RA:SU:In Russian)
Thermodynamic Properties
Properties of hot expanded liquid aluminum, 8: 44200 (R:US)
ALUMINIUM 27 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
ALUMINIUM 27 TARGET
Kaon Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Pion Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Proton Reactions
Energy deposition in intermediate-energy nucleon-nucleus collisions, 8: 44989 (J:US)
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
ALUMINIUM 28
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
ALUMINIUM ALLOYS
See also ALUMINIUM BASE ALLOYS
Crystal Defects
Investigations of defective β-NiAl by transmission electron microscopy, 8: 44234 (BA:US)
Diffusion
Interdiffusion in β phase Cu—Al alloys, 8: 44207 (J:US)
Electric Conductivity
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_3 alloy, 8: 44213 (J:US)
Magnetic Susceptibility
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_3 alloy, 8: 44213 (J:US)
Physical Radiation Effects
Effects of self-annealing and reirradiation on the specific heat of Nb_3Al, 8: 44222 (J:US)
Sorptive Properties
Theory of bulk gettering, 8: 44296 (J:US)
Specific Heat
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_2 alloy, 8: 44213 (J:US)
ALUMINIUM ARSENIDES
Physical Radiation Effects
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
Quantum Efficiency
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
ALUMINIUM BASE ALLOYS
Annealing
Positron studies of solute clustering and lattice defects in Al-Zn alloys, 8: 44229 (BA:NL)
Physical Radiation Effects
Simulation irradiation of segregation-hardening Al and Ni alloys, 8: 44170 (RA:DE:In German)
ALUMINIUM OXIDES
See also SPINELS
Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel, 8: 44262 (R:US)
Atom Transport
Grain boundary and surface diffusion in oxide systems. Technical progress report, 8: 44243 (R:US)
Catalytic Effects
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Ion Collisions
Comparison of secondary electron yields from accelerated water cluster ions (M/z<50 000) striking Al_2O_3 and copper surfaces, 8: 44202 (J:US)
Secondary Emission
Comparison of secondary electron yields from accelerated water cluster ions (M/z<50 000) striking Al_2O_3 and copper surfaces, 8: 44202 (J:US)
ALUMINIUM SILICATES
Chemical Analysis
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)

Surface Properties
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
Temperature Effects
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
ALUMINUM
See ALUMINIUM
ALVEOLI (PULMONARY)
See LUNGS
AMBIENT TEMPERATURE
Variations
Long-term trends in dynamic height and sea surface temperature, 8: 44727 (R:US)
AMERICIUM PHOSPHATES
Raman Spectra
Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8: 44365 (J:NL)
AMES TEST
See MUTAGEN SCREENING
AMIDES
See also ACRYLAMIDE
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
AMINO ALCOHOLS
See ALCOHOLS
AMMONIA
Decomposition
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Phase Studies
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Production
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
AMORPHOUS STATE
Line Widths
Theory of dephasing of impurities in glasses, 8: 44285 (R:US)
ANAEROBIC DIGESTION
Bioreactors
Operational characteristics of anaerobic packed-bed reactors, 8: 43445 (J:US)
Chemical Reaction Kinetics
Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8: 43439 (R:US)
ANALYSIS (ACTIVATION)
See ACTIVATION ANALYSIS
ANALYSIS (THERMAL)
See THERMAL ANALYSIS
ANALYZERS (PULSE)
See PULSE ANALYZERS
ANGIOGRAPHY
See BIOMEDICAL RADIOGRAPHY
ANGRA-1 REACTOR
Control Elements
Adjusts of control rod cross sections and its utilization in power distribution calculations for Angra-1 reactor, 8: 43871 (RA:BR:In Portuguese)
Loss of Coolant
Analysis of the loss of coolant accident due to open failure in the pressurizer relief valve, for Angra-1 reactor, 8: 43918 (RA:BR:In Portuguese)
Contribution to the study of two-phase flow analysis considering the existence of a dynamic flow between the phases (Small break accident), 8: 43917 (RA:BR:In Portuguese)
Modelling for great breaks accident analysis in the primary system of Angra 1 reactor (Appendix K-10CRF 50), 8: 43919 (RA:BR:In Portuguese)
Reactor Accidents
First accident simulation of Angra-1 power plant using the ALMOD computer code, 8: 43913 (RA:BR:In Portuguese)
Reactor Cores
Protection set-points lines for the reactor core and considerations about power distribution and peak factors, 8: 43778 (RA:BR:In Portuguese)
Reactor Kinetics
Adjusts of control rod cross sections and its utilization in power distribution calculations for Angra-1 reactor, 8: 43871 (RA:BR:In Portuguese)
Anticipated simulation of Angra-1 start-up physical tests, 8: 43776 (RA:BR:In Portuguese)
Protection set-points lines for the reactor core and considerations about power distribution and peak factors, 8: 43778 (RA:BR:In Portuguese)
Transient analysis models for nuclear power plants, 8: 43777 (RA:BR:In Portuguese)
Reactor Start-Up
Anticipated simulation of Angra-1 start-up physical tests, 8: 43776 (RA:BR:In Portuguese)
Transient analysis models for nuclear power plants, 8: 43777 (RA:BR:In Portuguese)
Transients
Transient analysis models for nuclear power plants, 8: 43777 (RA:BR:In Portuguese)
ANGRA-2 REACTOR
Reactor Components
Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components, 8: 43769 (R:BR:In Portuguese)
Reactor Materials
Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components, 8: 43769 (R:BR:In Portuguese)
ANGRA-3 REACTOR
Reactor Components
Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components, 8: 43769 (R:BR:In Portuguese)
Reactor Materials
Procedure for the qualification of a manufacturer of ingot iron pieces for application in nuclear power plant components, 8: 43769 (R:BR:In Portuguese)
ANIMAL CELLS
Includes human cells.
Cell Proliferation
Alpha radiation-induced alterations of the proliferation kinetics, chromatin structure and gene expression in mammalian cells, 8: 44798 (R:DE:In German)
Chromosomal Aberrations
Alpha radiation-induced alterations of the proliferation kinetics, chromatin structure and gene expression in mammalian cells, 8: 44798 (R:DE:In German)
Radiation Injuries
Alpha radiation-induced alterations of the proliferation kinetics, chromatin structure and gene expression in mammalian cells, 8: 44798 (R:DE:In German)
ANIMAL SHELTERS
Heat Exchangers
Hog confinement farrowing-nursery building, 8: 43632 (RA:US)
ANIMALS
See also VERTEBRATES
Behavior
Model for the dispersal of seeds by animals, 8: 44713 (R:US)
ANNULAR FUEL ELEMENTS
Burnout
Entrainment effect on burnout in disperced-annular flow (on the base of numerical experiment results), 8: 43863 (R:SU:In Russian)
Heat Transfer
Entrainment effect on burnout in disperced-annular flow (on the base of numerical experiment results), 8: 43863 (R:SU:In Russian)

Void fraction and temperature in subcooled liquid flow in an annular channel, 8: 43862 (R:SU:In Russian)
Hydraulics
Entrainment effect on burnout in disperced-annular flow (on the base of numerical experiment results), 8: 43863 (R:SU:In Russian)
Void fraction and temperature in subcooled liquid flow in an annular channel, 8: 43862 (R:SU:In Russian)
Two-Phase Flow
Entrainment effect on burnout in disperced-annular flow (on the base of numerical experiment results), 8: 43863 (R:SU:In Russian)
Void fraction and temperature in subcooled liquid flow in an annular channel, 8: 43862 (R:SU:In Russian)

ANTELOPES
Predator-Prey Interactions
Pronghorn responses to hunting coyotes, 8: 44715 (J:US)

ANTENNAS
Gain
Transmit versus receive gains for microwave dish antennas, 8: 44458 (J:US)
Reflection
Ridge waveguide aperture antenna, 8: 45197 (B:FR:In French)

ANTHRACENE
Chemical Reactions
Post-shock chemical and ESR analysis of acrylamide and selected anthracene derivatives, 8: 44351 (R:US)

ANTIBIOTICS
See also DOXORUBICIN
Chemical Radiation Effects
Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982, 8: 44791 (R:XA)

ANTICORROSION
See CORROSION PROTECTION

ANTIFERROMAGNETIC MATERIALS
Ising Model
Critical behavior of a site-diluted three-dimensional Ising magnet, 8: 44293 (J:US)

ANTIMONY IONS
Electron-Ion Collisions
Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory, 8: 44890 (J:US)

ANTIPARTICLES
Quantum Operators
Matter-antimatter transition operators: A manual for modeling, 8: 44958 (J:NL)

ANTIPROTONS
Particle Production
Calculation of antoproton yields for the Fermilab Antiproton Source, 8: 44555 (J:NL)
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)

ANTRIM SHALES
See BLACK SHALES

APARTMENT BUILDINGS
Energy Conservation
Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience, 8: 44074 (R:US)
Energy Efficiency
Massachusetts Multi-Family Passive Solar Housing Program, 8: 43551 (RA:US)
Greenhouses
Solar greenhouse retrofit on roof of five-story tenment (low-income sweat equity coop) in East Harlem, N.Y.C., 8: 43637 (RA:US)
Passive Solar Heating Systems
Massachusetts Multi-Family Passive Solar Housing Program, 8: 43551 (RA:US)
Solar Cities and Towns Program, 8: 43487 (RA:US)

APPARATUS
See EQUIPMENT

APPLES
Enzymatic Hydrolysis
Saccharification and ethanol fermentation of apple pomace, 8: 43465 (J:US)

AQUATIC ECOSYSTEMS
Mathematical Models
Environmental modeling: ecosystems, 8: 44723 (RA:US)
Radioecology
Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors, 8: 44747 (R:DE:In German)

AQUEOUS SOLUTIONS
Criticality
Criticality calculations for safety analysis, 8: 44385 (RA:BR:In Portuguese)

AQUIFERS
Sensible Heat Storage
Determination of important physicochemical processes at an aquifer thermal-energy-storage site in Minnesota using both laboratory and field techniques, 8: 43973 (R:US)
Results of recent research on aquifer thermal-energy-storage technical issues, 8: 43974 (R:US)

ARAMIDS
Packings
PTFE/aramid packing in boiler feedwater pump saves over $2000/year, 8: 44105 (J:US)

ARGON
Atom-Atom Collisions
Two-state models of radiative collisions and related ionization effects (Cs + Cs; Xe + Ar), 8: 44904 (J:US)
Breakdown
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Collisions
Energy spectra of neutral particles measured with the time-of-flight and the stripping techniques, 8: 44854 (RA:SU)
Emission Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Laser-Radiation Heating
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Scattering
Energy spectra of neutral particles measured with the time-of-flight and the stripping techniques, 8: 44854 (RA:SU)
Visible Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Voids
Positron lifetime spectra of annealed argon matrices, 8: 44317 (BA:NL)

ARGON 38
Energy Levels
Study of the sup(39,41)K(d,^{3}He)sup(38,40)Ar reactions at 22.8 MeV, 8: 44999 (J:NL)

ARGON 40
Energy Levels
Study of the sup(39,41)K(d,^{3}He)sup(38,40)Ar reactions at 22.8 MeV, 8: 44999 (J:NL)

ARGON 40 REACTIONS
Compound-Nucleus Reactions
Charged-particle exclusive analysis of central Ar+KCl and Ar+Pb reactions at 1.8 and 0.8 GeV nucleon, 8: 45023 (J:US)

ARGON IONS
Collisions
Electron emission from metal-film systems under atomic particle bombardment, 8: 44871 (RA:SU:In Russian)
Orientational dependence od secondary ion emission in the direction of close packing, 8: 44866 (RA:SU:In Russian)
Photon emission from ion bombarded solids, 8: 44862 (RA:SU)
Secondary ion emission from concentrated alloys and compounds, 8: 44863 (RA:SU:In Russian)
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)

Ionization
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
Scattering
Scattering and sputtering under bombardment of a monocrystal by a gliding ion beam, 8: 44857 (RA:SU)
ARGONAUT TYPE REACTORS
Fuel Rods
Neutronic calculation of the next fuel elements for the Argonaut reactor, 8: 43889 (RA:BR:In Portuguese)
AROMATIC COMPOUNDS
See AROMATICS
AROMATICS
See also BENZENE
CONDENSED AROMATICS
HALOGENATED AROMATIC HYDROCARBONS
PHENOLS
POLYCYCLIC AROMATIC HYDROCARBONS
STYRENE
TOLUENE
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
ARSENIC
Air Pollution Control
Inorganic-arsenic emissions from glass-manufacturing plants: background information for proposed standards, 8: 44755 (R:US)
Preliminary study of sources of inorganic arsenic, 8: 44665 (R:US)
Environmental Impacts
Inorganic-arsenic emissions from glass-manufacturing plants: background information for proposed standards, 8: 44755 (R:US)
Stationary Pollutant Sources
Preliminary study of sources of inorganic arsenic, 8: 44665 (R:US)
ASHES
See also FLY ASH
Leachates
Disposal of waste material. Evaluation in the KHM project of short and long-term effects, 8: 43195 (RA:DK)
Leaching
Coal conversion solid waste disposal, 8: 43221 (J:US)
Studies on the leaching and weathering processes of coal ashes, 8: 43201 (RA:DK)
Marine Disposal
Ocean disposal and construction with stabilized coal waste blocks, 8: 43196 (RA:DK)
Materials Handling
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)
Pilot Plants
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Waste Disposal
Coal conversion solid waste disposal, 8: 43221 (J:US)
Disposal of waste material. Evaluation in the KHM project of short and long-term effects, 8: 43195 (RA:DK)
Waste Product Utilization
Ocean disposal and construction with stabilized coal waste blocks, 8: 43196 (RA:DK)
ASPHALTS
Aging
Aging test results of an asphalt membrane liner, 8: 43346 (R:US)
ASTATINE 204
Electron Capture Decay
Levels in $_{84}$204 Po from the decay of $_{85}$ ^{204}At, 8: 45016 (J:US)
ASTATINE ISOTOPES
See also ASTATINE 204
Radiochemical Analysis
Energy deposition accompanying pion double charge exchange: Radiochemical study of the ^{209}Bi(π^+,π^- xn)/sup 209-x/At reactions, 8: 45021 (J:US)
ASTRA REACTOR
After-Heat Removal
Control of the ASTRA decay heat removal system, 8: 43895 (R:AT:In German)
RHR Systems
Control of the ASTRA decay heat removal system, 8: 43895 (R:AT:In German)
ATF TORSATRON
Design
Design of the Advanced Toroidal Facility (ATF-1), 8: 45199 (R:US)
ATLANTIC OCEAN
See also CARIBBEAN SEA
Carbon Cycle
Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface, 8: 44742 (R:US)
ATOM TRANSPORT
Computer Calculations
DIFFUSE 83, 8: 45312 (R:US)
ATOM-ATOM COLLISIONS
Two-state models of radiative collisions and related ionization effects (Cs + Cs; Xe + Ar), 8: 44904 (J:US)
ATOMIC BEAMS
Laser Spectroscopy
Laser induced fluorescence spectroscopy in atomic beams of radioactive nuclides, 8: 44879 (R:DE)
ATOMIC ENERGY
See NUCLEAR ENERGY
ATOMIC FLUORESCENCE SPECTROSCOPY
See FLUORESCENCE SPECTROSCOPY
ATOMIC PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text books, etc.
Research Programs
Annual review of research projects 1981, 8: 44835 (R:AT)
ATOMS
See also MUONIC ATOMS
Electron Emission
Comment on high-Rydberg-state production in convoy electron experiments, 8: 44901 (J:US)
Vager et al. respond:, 8: 44902 (J:US)
Energy Levels
Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation, 8: 44407 (J:US)
Excitation
Exact dynamics of a model for a three-level quantum system interacting with a continuous spectrum, 8: 44886 (J:US)
Population Inversion
Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation, 8: 44407 (J:US)
Quantum Electronics
Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation, 8: 44407 (J:US)
Rydberg States
Comment on high-Rydberg-state production in convoy electron experiments, 8: 44901 (J:US)
Vager et al. respond:, 8: 44902 (J:US)
Wave Propagation
Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation, 8: 44407 (J:US)
Exact dynamics of a model for a three-level quantum system interacting with a continuous spectrum, 8: 44886 (J:US)
ATR REACTOR
Reactor Control Systems
Computer-based regulating control system for the Advanced Test Reactor, 8: 43870 (R:US)
ATRIA
Solar atrium: a hybrid solar heating and cooling system, 8: 43609 (RA:US)
ATTACHED GREENHOUSES
Comparative Evaluations
Passive solar heating of buildings with attached greenhouse, 8: 43573 (RA:US)
Computerized Simulation
Passive solar heating of buildings with attached greenhouse, 8: 43573 (RA:US)
Design
Monitoring and design study of the White Mountain School hybrid solar building, 8: 43581 (RA:US)

Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
Passive solar heating of buildings with attached greenhouse, 8: 43573 (RA:US)
Performance
Libertytown solar demonstration home, 8: 43576 (RA:US)
Performance prediction of attached sunspaces, 8: 43645 (R:US)
Performance analysis of a solar attached greenhouse near Three-Mile Island using fuel bill data, 8: 43584 (RA:US)
Performance Testing
Monitoring and design study of the White Mountain School hybrid solar building, 8: 43581 (RA:US)
Thermal Analysis
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
AUSTENITIC STEELS
Prior to February, 1978 STEELS and AUSTENITE were used to index this concept.
Corrosion Fatigue
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Crack Propagation
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Fractography
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Physical Radiation Effects
Swelling behavior of ferrites and austenites exposed to heavy ions, 8: 44169 (RA:DE:In German)
Swelling
Swelling behavior of ferrites and austenites exposed to heavy ions, 8: 44169 (RA:DE:In German)
AUSTRALIA
See also WESTERN AUSTRALIA
Uranium Deposits
Geography - outline of deposits, where they are, how much they contain, 8: 43311 (R:AU)
Uranium Ores
Government development and export policies, 8: 44017 (R:AU)
AUSTRIA
Air Pollution
Emission cadastre Lower Austria, 8: 44685 (R:AT:In German)
Vehicle-emission cadastre Lower Austria, 8: 44686 (R:AT:In German)
AUSTRIAN RESEARCH REACTOR
See ASTRA REACTOR
AUTOCLAVES
Degassing
Experience with an autoclave-refreshing system for crack growth measurements under PWR- and BWR-environmental conditions, 8: 43753 (RA:US)
Design
Experience with an autoclave-refreshing system for crack growth measurements under PWR- and BWR-environmental conditions, 8: 43753 (RA:US)
Feedwater Heaters
Experience with an autoclave-refreshing system for crack growth measurements under PWR- and BWR-environmental conditions, 8: 43753 (RA:US)
AUTOMOBILE EFFICIENCY STANDARDS
See AUTOMOBILES
AUTOMOBILES
Exhaust Gases
Criticism on the mass spectra of some polycyclic aromatic compounds detected in automobile exhaust gas, 8: 44684 (RA:DE:In German)
AUTOMOTIVE FUELS
Production
Fuels of the future, 8: 43424 (RA:DE:In German)
AUTORADIOGRAPHS
See IMAGES
AUTORADIOGRAPHY
Television Cameras
Electronic method for autofluorography of macromolecules on two-d matrices, 8: 44648 (P:US)
AVIATION FUELS
Fuel Consumption
Aviation fuels - today and tomorrow, 8: 44091 (R:DE:In German)

B

B CODES
BETA3A user' s manual, 8: 43274 (R:NO)
BETAPLOT user' s manual, 8: 43275 (R:NO)
BAG MODEL
Kinetic Energy
Phenomenological surface inertia in the MIT bag model, 8: 44936 (J:US)
Mass Formulae
Meson, baryon, and glueball masses in the MIT bag model, 8: 44943 (J:US)
Moment of Inertia
Phenomenological surface inertia in the MIT bag model, 8: 44936 (J:US)
Strong-Coupling Model
Static-bag-source meson field theory: Strong-coupling approximation, 8: 44935 (J:US)
BAHRAIN
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
BANKS
See COMMERCIAL BUILDINGS
BARIUM
Electron Emission
Electron emission from metal-film systems under atomic particle bombardment, 8: 44871 (RA:SU:In Russian)
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
BARIUM CHLORIDES
Formation Heat
Enthalpies of formation of strontium dichloride and of the strontium ion (Sr^{2+}) in water and in 1 $mol.dm^{-3}$ HCl, and an assessment of enthalpies of formation of alkaline-earth dichlorides, 8: 44338 (J:GB)
BARLEY
Sensitivity
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
BARSTOW SOLAR PILOT PLANT
10-MW solar central receiver pilot plant at Barstow, California.
Design
Solar one generates first electricity: commercial design completed, 8: 43540 (J:GB)
Reviews
Solar One Project, 8: 43537 (RA:US)
BARYONIUM
Particle Production
Search for production of narrow p-barp states with a 5-Gev/cp-bar beam, 8: 44925 (J:US)
BARYONS
Mass Formulae
Meson, baryon, and glueball masses in the MIT bag model, 8: 44943 (J:US)
Mass Spectra
Quark model with one-gluon corrections. Radially excited states, 8: 44933 (J:US)
BASALT
Boreholes
Drilling history of core hole DB-15, 8: 43379 (R:US)
Hydrology
Drilling history of core hole DB-15, 8: 43379 (R:US)

Lithology
Drilling history of core hole DB-15, 8: 43379 (R:US)
Sorptive Properties
Selenium sorption on a Columbia River basalt, 8: 44819 (R:US)
BEAM BENDING MAGNETS
Alignment
Fragment of the system for tracking accelerator deformations, and test results for the system, 8: 44556 (TJ:US)
BEAM BUNCHING
Beam Currents
Bunching of intense beams, 8: 44490 (RA:DE)
Computerized Simulation
Simulation of the longitudinal dynamics of a cold bunched beam, 8: 44492 (RA:DE)
BEAM DYNAMICS
See also BEAM BUNCHING
Coupling
Remark on coupled motion and equipartitioning, 8: 44487 (RA:DE)
BEAM EXTRACTION
Beam Monitors
Measurement of proton beam intensity and efficiency at slow extraction, 8: 44534 (R:SU:In Russian)
BEAM FOCUSING MAGNETS
Corrections
Multiple sextupole system for the correction of third and higher order aberration, 8: 44508 (P:US)
BEAM INJECTION
See also ELECTRON BEAM INJECTION
ION BEAM INJECTION
RELATIVISTIC BEAM INJECTION
Phase Space
Longitudinal phase-space matching between microtrons at 185 MeV, 8: 44513 (R:US)
BEAM INJECTION HEATING
Electron Beams
Experimental investigation of high-current REB interaction with plasma, 8: 45123 (RA:CS:In Russian)
Energy Balance
Dynamical model of an overheated magnetized plasma, 8: 45127 (RA:CS)
Ion Beam Injection
Study of transport mechanisms for energetic-ion heating of INTOR-size tokamaks. Final technical report, 2 June 1982-31 May 1983, 8: 45098 (R:US)
BEAM MONITORING
Colorimetric Dosemeters
Investigation of possibility for using color threshold detectors in the determination of accelerated ion fluence, 8: 44598 (R:SU:In Russian)
BEAM MONITORS
Magnetoinduction Sensors
Induction pick-up of placement of electron beam centre of gravity, 8: 44541 (R:SU:In Russian)
Performance
Simple current-to-frequency converter, 8: 44550 (R:SU:In Russian)
Secondary Emission Detectors
Measurement of proton beam intensity and efficiency at slow extraction, 8: 44534 (R:SU:In Russian)
BEAM-PLASMA SYSTEMS
Beam Transport
Experimental investigation of high-current REB interaction with plasma, 8: 45123 (RA:CS:In Russian)
Computerized Simulation
Computer simulations of reflex E-beam systems and plasma, 8: 45124 (RA:CS)
Equations of Motion
Simulation code of relativistic electron beam diodes, 8: 45135 (RA:CS)
Plasma Diamagnetism
Dynamical model of an overheated magnetized plasma, 8: 45127 (RA:CS)
Plasma Instability
Eigenfunction analysis of the beam—plasma instability with finite radial dimensions, 8: 45167 (J:US)
Plasma Waves
Modulation instability in a plasma-electron beam system, 8: 45104 (R:SU)
BEARINGS
Fabrication
Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8: 44134 (R:US)
Performance Testing
Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8: 44134 (R:US)
BEAUTY PARTICLES
Particle Decay
Beauty experiments at the SPS, 8: 44914 (R:CH)
Particle Production
Beauty experiments at the SPS, 8: 44914 (R:CH)
BEETS
See also SUGAR BEETS
Fermentation
Fermentation studies on extracts of beet, 8: 43452 (R:NZ)
BELOYARSK-3 REACTOR
Fuel Assemblies
Heat transfer in peripheral region of fast reactor fuel assembly. Part 2. Experimental study of temperature fields in fuel assembly side region at rated rod position, 8: 43814 (R:CS:In Russian)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 3. Experimental study of temperature fields in fuel assembly side region at non-rated rod position, 8: 43815 (R:CS:In Russian)
Heat transfer in peripheral region of fast reactor fuel assembly. Part 4. Temperature conditions in fuel assembly with inserts in marginal cells, 8: 43816 (R:CS:In Russian)
BENTHOS
Chemical Analysis
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
Sampling
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
BENZENE
Ecological Concentration
Chemical characterization of emmissions from wood-fired stoves, 8: 43510 (R:NO:In Norwegian)
Phase Studies
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Raman Spectroscopy
Single-pulse coherent Raman spectroscopy in shock-compressed benzene, 8: 44327 (R:US)
BER-2 REACTOR
Research Programs
Proposal for extension of the Berlin Research Reactor BER II, 8: 43887 (R:DE:In German)
BERGIUS PROCESS
Commercialization
First experiences and results of the 200 T/D pilot plant Bottrop, 8: 43155 (RA:US)
Feasibility Studies
First experiences and results of the 200 T/D pilot plant Bottrop, 8: 43155 (RA:US)
BERKELIUM PHOSPHATES
Raman Spectra
Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8: 44365 (J:NL)
BERLIN-2 RESEARCH REACTOR
See BER-2 REACTOR

BERYLLIUM
Health Hazards
Beryllium health hazards, 8: 44805 (R:FR:In French)
Pion Minus Reactions
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)
BERYLLIUM 9 TARGET
Helium 3 Reactions
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
Proton Reactions
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
BERYLLIUM MODERATORS
See BERYLLIUM
BESSEL DIFFERENTIAL EQUATION
See FOKKER-PLANCK EQUATION
BETA BEAMS (ELECTRONS)
See ELECTRON BEAMS
BETA DETECTION
CDTE Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
HgI2 Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
Si Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
BETA II DEVICES
This device was formerly known as 2XIIB.
Plasma Production
Investigations of the magnetic structure and the decay of a plasma-gun-generated compact torus, 8: 45168 (J:US)
BIG ROCK POINT REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
BI-GAS PROCESS
Pilot Plants
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)
BINDERS
Materials Testing
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8: 43167 (R:US)
BIOCENOSES
See ECOSYSTEMS
BIOCHEMICAL FUEL CELLS
Electrochemistry
Applied aspects of bioelectrochemistry: fuel cells, sensors, and bioorganic synthesis, 8: 44059 (J:US)
BIOCONVERSION
See also ANAEROBIC DIGESTION
FERMENTATION
Meetings
Fourth symposium on biotechnology in energy production and conservation, 8: 43421 (B:US)
BIOGAS
See METHANE
BIOGEOCENOSES
See ECOSYSTEMS
BIOLOGICAL DOSEMETERS
Calibration
Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982, 8: 44791 (R:XA)
BIOLOGICAL MODELS
Optimization
Environmental modeling: ecosystems, 8: 44723 (RA:US)
BIOLOGICAL RADIATION EFFECTS
Biological Indicators
Cytometric analysis of mammalian sperm for induced morphologic and DNA content errors, 8: 44801 (R:US)
BIOLOGICAL REACTORS
See BIOREACTORS
BIOMASS
Bioconversion
Fourth symposium on biotechnology in energy production and conservation, 8: 43421 (B:US)
Electrochemistry
Applied aspects of bioelectrochemistry: fuel cells, sensors, and bioorganic synthesis, 8: 44059 (J:US)
Energy Demand
Future energy landscape. Geographic image of the energy bill of 1981, 8: 44029 (R:SE:In Swedish)
Energy Source Development
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
On-farm biomass program, 8: 43506 (RA:US)
Fungi
Occurrence of fungus spores in chip combustion and storage installations. II., 8: 43504 (R:NO:In Norwegian, English)
Gasification
Development of biomass gasification to produce substitute fuels, 8: 43428 (RA:US)
Economic evaluation of indirect biomass liquefaction processes for production of methanol and gasoline, 8: 43456 (BA:US)
Predictive model for stratified downdraft gasification of biomass, 8: 43429 (RA:US)
Proceedings of the 15th biomass thermochemical conversion contractor's meeting, 8: 43425 (R:US)
Technical and economic assessment of emerging advanced biomass thermochemical conversion techniques, 8: 43432 (RA:US)
Liquefaction
Basic research in biomass direct liquefaction, 8: 43437 (RA:US)
Proceedings of the 15th biomass thermochemical conversion contractor's meeting, 8: 43425 (R:US)
Market
Strategic analysis. A proposal for a method of investigation illustrated by the future competing situation of coal with biomass fuels, 8: 43266 (R:SE:In Swedish)
Meetings
Proceedings of the 15th biomass thermochemical conversion contractor's meeting, 8: 43425 (R:US)
Pyrolysis
Development of an indirectly heated pyrolysis reactor, 8: 43430 (RA:US)
Uses
On-farm biomass program, 8: 43506 (RA:US)
Potential for chemicals from biomass, 8: 43515 (BA:US)
BIOMASS CONVERSION PLANTS
Use only for plants converting biomass to fuel, do NOT use for plants preparing wastes and biomass for combustion.
Air Pollution
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Commercialization
Liquid fuels from wood by continuous operation of the Albany, Oregon biomass liquefaction facility, 8: 43441 (BA:US)
Economic Analysis
Economic evaluation of indirect biomass liquefaction processes for production of methanol and gasoline, 8: 43456 (BA:US)
Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8: 43439 (R:US)
Manpower
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Material Balance
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Net Energy
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)

Operation
Liquid fuels from wood by continuous operation of the Albany, Oregon biomass liquefaction facility, 8: 43441 (BA:US)
Waste Processing
Utilization of waste streams in biomass gasifiers, 8: 43431 (RA:US)
BIOMASS PLANTATIONS
Economic Analysis
First three years of the Department of Energy Grant. Final report (Potential of integrating the production of wood for energy into the existing forest products supply system), 8: 43493 (R:US)
The economics of hardwood fuels produced on biomass plantations, 8: 43513 (BA:US)
Economic Impact
Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops, 8: 43514 (BA:US)
Feasibility Studies
First three years of the Department of Energy Grant. Final report (Potential of integrating the production of wood for energy into the existing forest products supply system), 8: 43493 (R:US)
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
Harvesting Equipment
First three years of the Department of Energy Grant. Final report (Potential of integrating the production of wood for energy into the existing forest products supply system), 8: 43493 (R:US)
Land Use
Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops, 8: 43514 (BA:US)
Research Programs
The economics of hardwood fuels produced on biomass plantations, 8: 43513 (BA:US)
Socio-Economic Factors
Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops, 8: 43514 (BA:US)
BIOMEDICAL RADIOGRAPHY
See also INDUSTRIAL RADIOGRAPHY.
Image Processing
Automatic seed identification technique for interstitial implants using three isocentric radiographs, 8: 44778 (J:US)
BIOREACTORS
Prior to March 1983 this concept was indexed to CHEMICAL REACTORS.
Comparative Evaluations
Use of immobilized cells of Zymomonas mobilis in a novel fluidized bioreactor to produce ethanol, 8: 43463 (J:US)
Cost
Reactor optimization for enzymatic hydrolysis of cellulose, 8: 43461 (J:US)
Design
Anaerobic biological treatment of coal gasifier effluent, 8: 43446 (J:US)
Kinetics and advanced digester design for anaerobic digestion of water hyacinth and primary sludge, 8: 43447 (J:US)
Reactor optimization for enzymatic hydrolysis of cellulose, 8: 43461 (J:US)
Operation
Operational characteristics of anaerobic packed-bed reactors, 8: 43445 (J:US)
BIPYRIDINES
Excited States
Theoretical model for the luminescing excited states of Ru $(bpy)_3^{2+}$ and $Os(bpy)_3^{2+}$ (bpy = 2,2'-bipyridine), 8: 44334 (R:US)
BIRDS
See also FOWL
Population Dynamics
Competition between West Indian anoles and birds, 8: 44714 (J:US)
Predator-Prey Interactions
Competition between West Indian anoles and birds, 8: 44714 (J:US)
BISMUTH 209
Energy Levels
Structure of ^{209}Bi deduced from the $^{208}Pb(t,2n\gamma)$ reaction, 8: 45017 (J:US)
BISMUTH 209 TARGET
Neutron Reactions
Neutron elastic scattering in the energy region 1.5 to 4.0 MeV for radiogenic lead and bismuth, 8: 45015 (R:SE)
Pion Plus Reactions
Energy deposition accompanying pion double charge exchange: Radiochemical study of the $^{209}Bi(\pi^+,\pi^-xn)$/sup 209-x/At reactions, 8: 45021 (J:US)
BITTER SPAR
See DOLOMITE
BITUMENS
See also ASPHALTS
Chemical Composition
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Chemical Properties
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Heterocyclic Compounds
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Physical Properties
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
BITUMINOUS COAL
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Hydrogenation
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)
BLACK COAL
See also BITUMINOUS COAL
Carbonization
Coal preheating plant according to the PRECARBONsup(R) process successfully commissioned for DONNER-HANNA Coke Joint Venture in Buffalo, NY, USA, 8: 43184 (R:DE:In German, English)
Heat Treatments
Coal preheating plant according to the PRECARBONsup(R) process successfully commissioned for DONNER-HANNA Coke Joint Venture in Buffalo, NY, USA, 8: 43184 (R:DE:In German, English)
Minerals
Systematic studies on coals of different deposits, including their mineral matter, 8: 43190 (R:DE:In German)
Petrography
Systematic studies on coals of different deposits, including their mineral matter, 8: 43190 (R:DE:In German)
BLACK SHALES
Explosive Fracturing
High-energy gas-fracturing develpoment. Annual report, April 1982-March 1983, 8: 43296 (R:US)
In-Situ Processing
Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977 (Michigan), 8: 43304 (R:US)
BLADES (TURBINES)
See TURBINE BLADES
BLANKETS (BREEDING)
See BREEDING BLANKETS
BLASTING
See EXPLOSIVE FRACTURING
BLOCKING
See CHANNELING
BLOWDOWN
Mathematical Models
Use of the modal superposition technique for piping system blowdown analyses (PWR; BWR), 8: 43905 (R:US)

Pressure Gradients
Use of the modal superposition technique for piping system blowdown analyses (PWR; BWR), 8: 43905 (R:US)
BLOWOUTS
Control
Well control in case of offshore blowout. Well killing-final control-after shut-in in relation to the various control methods, 8: 43281 (R:NO)
Well control in case of offshore blowout. Capping on the sea floor, blowout risk of subsea oil production, 8: 43282 (R:NO)
Oil Pollution Containment
Well control in case of offshore blowout. Oil collection on platforms, 8: 43279 (R:NO)
BN-600 REACTOR
See BELOYARSK-3 REACTOR
BOILERS
See also FLUIDIZED BED BOILERS
Air Pollution Control
Increased opportunities for coal in industrial markets, 8: 43265 (RA:US)
Boiler Fuels
Increased opportunities for coal in industrial markets, 8: 43265 (RA:US)
Computerized Control Systems
Conversion to coal in Du Pont, 8: 43728 (RA:US)
Design
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Fuel Substitution
Conversion to coal in Du Pont, 8: 43728 (RA:US)
Performance Testing
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Pollution Control Equipment
Conversion to coal in Du Pont, 8: 43728 (RA:US)
Retrofitting
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)
Conversion to coal in Du Pont, 8: 43728 (RA:US)
Retrofit of a package boiler to utilize producer gas (Fuel oils to low Btu gas), 8: 43730 (RA:US)
Size
Increased opportunities for coal in industrial markets, 8: 43265 (RA:US)
BOILING
Critical Heat Flux
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 1. Main report and Appendices A-D, 8: 44429 (R:US)
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 2. Appendix E, 8: 44430 (R:US)
BOILING WATER COOLED AND MODERATED REACTO
See BWR TYPE REACTORS
BONES
See SKELETON
BOREHOLES
Fracturing
Multiple fracturing of boreholes by using tailored-pulse loading, 8: 44462 (J:US)
Pressurizing
Multiple fracturing of boreholes by using tailored-pulse loading, 8: 44462 (J:US)
Reservoir Temperature
Preparatory investigation for geothermal heat pump plant in the commune of Landskrona, 8: 43657 (R:SE:In Swedish)
Water Influx
Water inflow into boreholes during the Stripa heater experiments, 8: 43362 (R:US)
Well Logging
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)
State of New York peat-resource inventory. Volume II, 8: 43246 (R:US)
BORON 10 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
BORON 11
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
BORON 11 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
BORON 11 TARGET
Neutron Reactions
Structure of ^{12}B from measurement and R-matrix analysis of sigma(theta) for ^{11}B(n,n)^{11}B and ^{11}B(n,n')^{11}Bsup(*)(2.12 MeV), and shell-model calculations, 8: 44988 (J:NL)
Proton Reactions
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
BORON 12
Energy Levels
Structure of ^{12}B from measurement and R-matrix analysis of sigma(theta) for ^{11}B(n,n)^{11}B and ^{11}B(n,n')^{11}Bsup(*)(2.12 MeV), and shell-model calculations, 8: 44988 (J:NL)
BORON 13
Energy Levels
Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction, 8: 44984 (J:US)
BORON ALLOYS
Deposition
Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings, 8: 44238 (TJ:US)
Physical Radiation Effects
Structural changes observed in (Mosub(.6)Rusub(.4))sub(x)Bsub(1-x) amorphous alloys observed with positron annihilation, 8: 44231 (BA:NL)
BOROSILICATE GLASS
Leaching
Neptunium concentrations in solutions contacting actinide-doped glass, 8: 43398 (J:US)
BOROSILICATES
See BOROSILICATE GLASS
BOUNDARIES (GRAIN)
See GRAIN BOUNDARIES
BRACKISH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
BRAIN
Blood Flow
Local cerebral blood flow (1CBF) and oxygen consumption (1CMRO$_2$) in evolving irreversible ischemic infarction: a study with positron tomography and oxygen-15, 8: 44762 (R:FR)
Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine, 8: 44765 (R:FR:In French)
Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man, 8: 44764 (R:FR)
Neoplasms
Case-control study of brain tumors among white males employed at the Rocky Flats Plant, 8: 44800 (R:US)
Positron Computed Tomography
Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine, 8: 44761 (R:FR)
In vivo study of the dopaminergic receptors in the brain of man using ^{11}C-pimozide and positron emission tomography, 8: 44763 (R:FR)
Local cerebral blood flow (1CBF) and oxygen consumption (1CMRO$_2$) in evolving irreversible ischemic infarction: a study with positron tomography and oxygen-15, 8: 44762 (R:FR)
Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine, 8: 44765 (R:FR:In French)

Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man, 8: 44764 (R:FR)
Some radiopharmaceuticals derived from carbon-eleven labelled phosgene. Synthesis and clinical application, 8: 44770 (R:NL)

BRAKING RADIATION
See BREMSSTRAHLUNG

BRASS-ALPHA
Stacking Faults
Evidence for stacking faults in multiaxial strained alpha-brass, 8: 44172 (R:US)

BRAZIL
Atomic Energy Agreements
Economical and strategical aspects of Brazilian-Germany nuclear agreement, 8: 44016 (R:BR:In Portuguese)
Tlatelolco Treaty
Some considerations on the Tlatelolco Treaty, 8: 44024 (R:BR:In Portuguese)

BREEDER REACTORS
See also FBR TYPE REACTORS
Reactor Cores
Accelerator breeder with uranium, thorium target, 8: 43836 (R:US)
Reactor Kinetics
Accelerator breeder with uranium, thorium target, 8: 43836 (R:US)

BREEDING BLANKETS
Design
US-DOE Fusion-Breeder Program: blanket design and system performance, 8: 45263 (R:US)
Neutron Transport
Neutron multiplier alternative for fusion reactor blankets, 8: 45240 (R:PL)
Process Heat
Methodology for Monte Carlo geometrical perturbation analysis with application to a process heat fusion blanket, 8: 45282 (J:US)

BREMSSTRAHLUNG
See also SYNCHROTRON RADIATION
Production
Neutron-proton bremsstrahlung at 4.8 MeV, 8: 45058 (B:ZA)

BREMSSTRAHLUNG (MAGNETIC)
See SYNCHROTRON RADIATION

BRINES
Migration
Brine migration test for Asse Mine, Federal Republic of Germany: final test plan, 8: 43367 (R:US)
Removal
Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977, 8: 43304 (R:US)

BRIQUETS
Binders
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8: 43167 (R:US)
Combustion
Pellets as fuel. Basic properties and experience from tests in moving grate firing units, 8: 43471 (R:SE:In Swedish)

BROMINE
Carbon 12 Reactions
Calendar of high multiplicity ^{12}C induced reactions in Ag (Br), 8: 45000 (R:SE)

BROMINE 82
Beta Decay
Collective excitations of ^{82}Kr observed by in-beam and decay spectroscopy and their characterization by the interacting boson model, 8: 45001 (J:US)

BROMINE BROMIDES
See BROMINE

BROMINE COMPOUNDS
X-Ray Spectra
EXAFS study of bromomanganate ions in molten salts, 8: 44286 (J:US)

BRONCHITIS
Diagnosis
Application of radioactive aerosols in diagnostic techniques of bronchial obstructions in the clinical practice, 8: 44771 (RA:DE:In German)

BRONCHOGENIC CARCINOMA
See CARCINOMAS

BRONZE
Fabrication
Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8: 44134 (R:US)

BROOKHAVEN AGS
Beam Injection
Possible use of synchrotrons as post-acceleration boosters for tandems, 8: 44509 (R:US)
Hydrogen 1 Minus Beams
Status of the AGS polarized negative-ion source, 8: 44512 (R:US)
Polarized Beams
Status of the AGS polarized negative-ion source, 8: 44512 (R:US)
Research Programs
BNL AGS - a context for kaon factories, 8: 44510 (R:US)

BROOKHAVEN INTERSECTING STORAGE ACCELERAT
See ISABELLE STORAGE RINGS

BROWN COAL
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Coal Reserves
Brown-coal reserves of Denmark. Report of phase 1, 8: 43245 (R:DK:In Danish)
Pyrolysis
Experiments and model calculations on pyrolysis and gasification of Rhenish lignite in an inclined revolving pipe, 8: 43183 (R:DE:In German)

BUBBLE CHAMBERS
See also CRYOGENIC BUBBLE CHAMBERS
HEAVY LIQUID BUBBLE CHAMBERS
Data Acquisition Systems
Program selection of physical hypothesis in the film information processing system, 8: 44599 (R:SU:In Russian)
Holography
Laser for holographic track detection in a bubble chamber, 8: 44577 (R:SU:In Russian)

BUGEY-1 REACTOR
Reactor Materials
Corrosion and the corrosion inhibition effects in the BUGEY 1 reactor, 8: 43789 (R:FR:In French)

BUILDING CODES
Building energy performance standards. Phase IV. Code parameter list and code format listing, 8: 44070 (R:US)
Data Acquisition
Building energy code input form with instructions for completion, 8: 44068 (R:US)
Evaluation
Development of a building energy-code input form, 8: 44072 (R:US)

BUILDING MATERIALS
See also CONCRETE BLOCKS
Natural Radioactivity
Radiation burden in dwelling-houses by radon and its daughter elements, 8: 44698 (RA:AT:In German)
Radioactivity measurement of building materials, 8: 44699 (RA:AT:In German)
Radiation Monitoring
Radioactivity measurement of building materials, 8: 44699 (RA:AT:In German)
Retailers
Building supplier as energy information center, 8: 43485 (RA:US)

BUILDINGS
See also ANIMAL SHELTERS
COMMERCIAL BUILDINGS
FEDERAL BUILDINGS
GREENHOUSES
OFFICE BUILDINGS

PREFABRICATED BUILDINGS
PUBLIC BUILDINGS
RESIDENTIAL BUILDINGS
SCHOOL BUILDINGS

Energy Analysis
Applications of DOE-2 for the analysis of passive solar buildings, 8: 43571 (RA:US)

Energy Conservation
CO_2-based ventilation in buildings, 8: 44080 (R:XE:In French and English)

Energy Efficiency
Building energy performance standards, Phase III. Reference building set to be used as a vehicle for testing energy-code equivalency. Preliminary draft, 8: 44069 (R:US)

Environmental Engineering
Ventilation, filtration and radon, 8: 44666 (RA:DK:In Danish)

Natural Radioactivity
Ventilation, filtration and radon, 8: 44666 (RA:DK:In Danish)

Passive Solar Cooling Systems
LASL passive program, 8: 43570 (RA:US)

Passive Solar Heating Systems
Applications of DOE-2 for the analysis of passive solar buildings, 8: 43571 (RA:US)
LASL passive program, 8: 43570 (RA:US)
Potential for solar applications in DOE's Building Energy Performance Standards Program, 8: 43552 (RA:US)

Solar Heating Systems
New directions in the US solar heating and cooling program, 8: 43482 (RA:US)

Solar Water Heaters
Potential for solar applications in DOE's Building Energy Performance Standards Program, 8: 43552 (RA:US)

Standards
Building energy performance standards, Phase III. Reference building set to be used as a vehicle for testing energy-code equivalency. Preliminary draft, 8: 44069 (R:US)
Building energy performance standards. Phase III. Selection of the reference building set, 8: 44073 (R:US)
Potential for solar applications in DOE's Building Energy Performance Standards Program, 8: 43552 (RA:US)

Ventilation
Ventilation control by means of CO_2 determination, 8: 44667 (RA:DK:In Swedish)

Ventilation Systems
CO_2-based ventilation in buildings, 8: 44080 (R:XE:In French and English)

BUILDINGS (CONTAINMENT)
See CONTAINMENT BUILDINGS

BUNCHING (BEAM)
See BEAM BUNCHING

BUNDLES (FUEL ELEMENTS)
See FUEL ELEMENT CLUSTERS

BUNKER OILS
See RESIDUAL FUELS

BURNERS
Design
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)

BURSA OF FABRICIUS
See BIRDS

BUSHINGS
Fabrication
Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8: 44134 (R:US)

Performance Testing
Process development of making bearings and bushings from continuous-cast SAE 660 bronze alloy plate. Final report, 8: 44134 (R:US)

BUTANE
Ignition Quality
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)

BUTANOIC ACID
See BUTYRIC ACID

BUTENES
Molecular Structure
Molecular structure of hydrocarbon monolayers on metal surfaces, 8: 44353 (J:US)

BUTYLENES
See BUTENES

BUTYRIC ACID
Production
Acidogenic bioconversion of C_1 compounds, 8: 43522 (J:US)

BWR TYPE REACTORS
See also BIG ROCK POINT REACTOR
DRESDEN-1 REACTOR
DRESDEN-2 REACTOR
LACBWR REACTOR
MILLSTONE-1 REACTOR
OYSTER CREEK-1 REACTOR
VK-50 REACTOR

Blowdown
Use of the modal superposition technique for piping system blowdown analyses, 8: 43905 (R:US)

Construction
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)

Containment Buildings
Hydrogen combustion characteristics related to reactor accidents, 8: 43935 (R:US)
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8: 43911 (R:DE:In German)

Containment Systems
Hydrogen-burn analyses of ice-condenser containments, 8: 43942 (R:US)

Decommissioning
Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation, 8: 43756 (R:US)

Decontamination
Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation, 8: 43756 (R:US)

Engineered Safety Systems
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)

Fuel Cans
Kalman filter-based gap conductance modeling, 8: 43748 (R:US)

Fuel Elements
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8: 43746 (R:US)

Fuel Management
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)

Fuel Pellets
Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup, 8: 43747 (R:US)
Kalman filter-based gap conductance modeling, 8: 43748 (R:US)

Fuel Rods
VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8: 43745 (R:US)

Inspection
Application of an automatic pattern recognition for aleatory signals for the surveillance of nuclear reactor and rotating machinery, 8: 43749 (R:BR:In Portuguese)
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)

Loss of Coolant
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8: 43912 (RA:BR:In Portuguese)
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a, 8: 43906 (R:US)

Loss of Flow
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8: 43912 (RA:BR:In Portuguese)

Meltdown
Hydrogen-burn analyses of ice-condenser containments, 8: 43942 (R:US)
Net Energy
Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8: 43830 (R:US)
Pipes
Experimental damping data for dynamic analysis of nuclear power plant piping systems, 8: 43904 (R:US)
Nuclear power plant piping damping parametric effects, 8: 43907 (R:US)
Use of the modal superposition technique for piping system blowdown analyses, 8: 43905 (R:US)
Pressure Vessels
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Qualification of automated techniques for meeting ASME code and NRC requirements, 8: 43820 (R:US)
Primary Coolant Circuits
Analytical investigation concerning condensation of steam with low air content, 8: 43967 (TG:US)
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a, 8: 43906 (R:US)
Fracture mechanics evaluation of reactor piping reliability. Pt. 2. Simulation of pipe rupture probability, 8: 43966 (BA:NL)
Quality Assurance
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Reactor Accidents
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)
Evaluation of severe accident safety system value based on averting financial risks, 8: 43950 (R:US)
Hydrogen combustion characteristics related to reactor accidents, 8: 43935 (R:US)
Reactor Control Systems
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981, 8: 43873 (R:US)
Reactor Core Disruption
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8: 43899 (R:US)
Reactor Instrumentation
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981, 8: 43873 (R:US)
Reactor Licensing
Applications of PRA in licensing, 8: 43958 (BA:US)
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Regulatory licensing status summary report. Nuclear power plants data for decisions (Blue Book), June 1-June 30, 1983, 8: 43823 (R:US)
Reactor Maintenance
The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory, 8: 43956 (BA:US)
Reactor Materials
Crack growth studies on a carbon steel in oxygenated high-pressure water at elevated temperatures, 8: 44189 (RA:US)
Device for investigating subcritical crack growth of RPV steel specimens under BWR conditions, 8: 43755 (RA:US)
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8: 43899 (R:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels, 8: 44180 (RA:US)
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8: 44178 (R:US)
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8: 44188 (RA:US)
Reactor Operation
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Reactor Operators
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)
Reactor Protection Systems
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Reactor Safety
Institutional implications of establishing safety goals for nuclear power plants, 8: 43940 (R:US)
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Light-Water-Reactor Safety-Technology Program. Quarterly report, January-March 1983, 8: 43951 (R:US)
Safety considerations for light-water-reactor nuclear power plants: a Swedish perspective, 8: 43947 (R:US)
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8: 43911 (R:DE:In German)
Reactor Sites
Reactor siting risk comparisons related to recommendations of NUREG-0625, 8: 43879 (BA:US)
Risk Assessment
Applications of PRA in licensing, 8: 43958 (BA:US)
Evaluation of severe accident safety system value based on averting financial risks, 8: 43950 (R:US)
Initial guidance on digraph-matrix analysis for systems interaction studies, 8: 43939 (R:US)
System Failure Analysis
Initial guidance on digraph-matrix analysis for systems interaction studies, 8: 43939 (R:US)
Transient Overpower Accidents
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8: 43912 (RA:BR:In Portuguese)
BY-PRODUCTS
Market
Business criteria for coal gasification, 8: 43158 (RA:US)

C

C-2260 RESONANCES
See LAMBDA-2250 RESONANCES
CABLES (ELECTRIC)
See ELECTRIC CABLES
CADMIUM
Biological Accumulation
Fucus Vesiculosus as a bioaccumulator of heavy metals, 8: 44807 (R:DE:In German)
Biological Availability
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8: 44759 (R:US)
Chemical Activation
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8: 44349 (R:US)
Electronic Structure
Valence electron momentum distributions in cadmium, 8: 44839 (R:AU)
Environmental Exposure Pathway
Effects of coal combustion and acidification on the cadmium exposure of the Swedish population, 8: 44806 (RA:DK)

Intestinal Absorption
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8: 44759 (R:US)
CADMIUM SULFIDE SOLAR CELLS
Technology Assessment
Photovoltaic cell and module status, 8: 43498 (RA:US)
CADMIUM TELLURIDE DETECTORS
See CDTE SEMICONDUCTOR DETECTORS
CADMIUM TELLURIDE SOLAR CELLS
Electrodeposition
Improved semiconductors for photovoltaic solar cells. Final report, July 15, 1977-July 14, 1978, 8: 43492 (R:US)
Performance Testing
Improved semiconductors for photovoltaic solar cells. Final report, July 15, 1977-July 14, 1978, 8: 43492 (R:US)
CADMIUM TELLURIDES
Chlorine Additions
Cadmium telluride detector crystals, alloyed by chlorine, 8: 44612 (RA:SU:In Russian)
Crystal Defects
Defect reactions and effects of coimplants and prior heat treatment in pulsed laser annealing of ion-implanted CdTe:In and CdTe:Cl, 8: 44314 (J:GB)
Crystal Doping
Cadmium telluride detector crystals, alloyed by chlorine, 8: 44612 (RA:SU:In Russian)
Grain Boundaries
Grain boundary phenomena in n-type CdTe films grown by hot wall vacuum evaporation, 8: 44289 (J:US)
Ion Implantation
Defect reactions and effects of coimplants and prior heat treatment in pulsed laser annealing of ion-implanted CdTe:In and CdTe:Cl, 8: 44314 (J:GB)
CALCITE
Phase Transformations
Nonhydrostatic effects in stress-wave induced phase transformation of calcite, 8: 44284 (R:US)
CALCIUM
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
Membrane Transport
Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8: 44786 (R:US)
CALCIUM 40 TARGET
Proton Reactions
"Wine-bottle" optical potentials and the inelastic scattering of protons near 200 MeV, 8: 44998 (J:NL)
Dirac-equation impulse approximation for intermediate-energy nucleon-nucleus scattering, 8: 44996 (J:US)
CALCIUM 42 TARGET
Pion Reactions
Pion single and double charge exchange in the resonance region: Dynamical corrections, 8: 45034 (J:US)
CALCIUM 48 TARGET
Pion Reactions
Pion single and double charge exchange in the resonance region: Dynamical corrections, 8: 45034 (J:US)
CALCIUM CHLORIDES
Formation Heat
Enthalpies of formation of strontium dichloride and of the strontium ion (Sr^{2+}) in water and in 1 $mol.dm^{-3}$ HCl, and an assessment of enthalpies of formation of alkaline-earth dichlorides, 8: 44338 (J:GB)
CALCIUM COMPLEXES
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)
CALCIUM COMPOUNDS
Catalytic Effects
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
CALCIUM ISOTOPES
Nuclear Radii
Laser induced fluorescence spectroscopy in atomic beams of radioactive nuclides, 8: 44879 (R:DE)
CALIFORNIA
Continental Shelf
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. I. Final environmental-impact statement OCS Sale No. 73, 8: 43288 (R:US)
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. II. Final environmental-impact statement OCS Sale No. 73, 8: 43289 (R:US)
Thermal Power Plants
Impacts of evaporative cooling towers in arid environments, 8: 43737 (J:GB)
CALIFORNIUM 252
Gamma Dosimetry
Measurements of gamma-ray dose from a moderated ^{252}Cf source, 8: 45059 (R:US)
CALIFORNIUM COMPOUNDS
Raman Spectra
Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8: 44365 (J:NL)
CALORIMETERS
Response Functions
Infrared calorimeter for time-resolved plasma energy flux measurement, 8: 45186 (J:US)
Time Resolution
Infrared calorimeter for time-resolved plasma energy flux measurement, 8: 45186 (J:US)
CALORIMETRIC DOSEMETERS
Testing
Investigation of polyethylene detector and adiabatic calorimeter in the radiation fields of proton accelerators, 8: 44573 (R:SU:In Russian)
CAMAC SYSTEM
Computer Application to Measurement And Control.
CAMDAS (CAMAC data-acquisition system), 8: 45315 (R:US)
Equipment Interfaces
CAMAC interface for TPC data-acquisition electronics, 8: 44620 (R:US)
CANADA
See also ONTARIO
Fertilizers
Fertilizer trends 1982, 8: 44009 (R:US)
Radioactive Materials
Radioactive material transport, 8: 44374 (R:CA)
Transportation incidents involving Canadian shipments of radioactive material. 1947 - 1978, 8: 44375 (R:CA)
Radioactive Waste Disposal
Fuel isolation research for the Canadian Nuclear Fuel Waste Management Program, 8: 43337 (R:CA)
Radioactive Waste Management
Fuel isolation research for the Canadian Nuclear Fuel Waste Management Program, 8: 43337 (R:CA)
CANCER
See NEOPLASMS
CANDIDA
Growth
Growth and citirc-acid production by Candida guilliermondii using a cellulose substrate, 8: 43520 (J:US)
CANDU TYPE REACTORS
On-Line Control Systems
Control and instrumentation systems for the 600 MWe CANDU PHW nuclear power plants, 8: 43867 (R:CA)
Pressure Tubes
Zircaloy behaviour in high temperature irradiated water, 8: 43793 (R:CA)
Reactor Control Systems
Design of multivariable controller for a 600 MWe CANDU nuclear power plant., 8: 43868 (R:CA)
Reactor Instrumentation
Control and instrumentation systems for the 600 MWe CANDU PHW nuclear power plants, 8: 43867 (R:CA)

Reactor Materials
Zircaloy behaviour in high temperature irradiated water, 8: 43793 (R:CA)
CANIS LATRANS
See COYOTES
CANONICAL EQUATIONS
See DIFFERENTIAL EQUATIONS
CAPACITIVE ENERGY STORAGE EQUIPMENT
5 KV low-induction capactitor battery, 8: 45231 (RA:SU:In Russian)
Failures
Protection of large capacitor banks, 8: 43969 (J:US)
CARBINOL
See METHANOL
CARBOHYDRATES
Thermochemical Processes
Thermochemical conversion of biomass to ethanol. Final report, 8: 43451 (R:US)
CARBON
See also CARBON BLACK
DIAMONDS
GRAPHITE
Charged-Particle Transport
Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8: 45041 (RA:DE)
Ecological Concentration
Carbon in live vegetation of major world ecosystems, 8: 44710 (R:US)
Electrical Properties
Electrical properties of glassy carbon, 8: 44281 (R:US)
Emission Spectra
Two photon laser induced fluorescence of carbon atoms, 8: 44882 (J:US)
Energy-Level Transitions
Two photon laser induced fluorescence of carbon atoms, 8: 44882 (J:US)
Fluorescence
Two photon laser induced fluorescence of carbon atoms, 8: 44882 (J:US)
Ion Collisions
Comment on high-Rydberg-state production in convoy electron experiments, 8: 44901 (J:US)
Vager et al. respond:, 8: 44902 (J:US)
Kaon Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Pion Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Proton Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
CARBON 11
Positron Computed Tomography
Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine, 8: 44761 (R:FR)
In vivo study of the dopaminergic receptors in the brain of man using ^{11}C-pimozide and positron emission tomography, 8: 44763 (R:FR)
Radiopharmaceuticals
Some radiopharmaceuticals derived from carbon-eleven labelled phosgene. Synthesis and clinical application, 8: 44770 (R:NL)
CARBON 12 REACTIONS
Multiplicity
Calendar of high multiplicity ^{12}C induced reactions in Ag (Br), 8: 45000 (R:SE)
CARBON 12 TARGET
Neutron Reactions
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8: 44977 (R:US)
Pion Plus Reactions
Observation of a quasideuteron component in the reaction ^{12}C(π^+,2p), 8: 44981 (J:US)
Pion Reactions
High resolution studies of pion-nucleus reaction mechanism, 8: 44975 (R:US)
Proton Reactions
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8: 44977 (R:US)
Microscopic formalism for intermediate energy transfer reactions: Application to the (p,d) and (d,p) reactions, 8: 44979 (J:US)
Production of positive pions by 800 MeV protons on carbon, 8: 44986 (J:US)
CARBON 13
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
Isotope Effects
Utilization of magnetic effects as a means of isotope enrichment. Annual technical progress report, July 1, 1982-June 30, 1983, 8: 44348 (R:US)
Isotope Ratio
Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios, 8: 44324 (R:US)
Isotope Separation
Utilization of magnetic effects as a means of isotope enrichment. Annual technical progress report, July 1, 1982-June 30, 1983, 8: 44348 (R:US)
Pion Minus Reactions
Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction, 8: 44984 (J:US)
CARBON 14 TARGET
Triton Reactions
$0^+ \rightarrow 0^-$ beta decay of ^{16}C, 8: 44987 (J:US)
CARBON 15
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
CARBON 16
Beta-Minus Decay
$0^+ \rightarrow 0^-$ beta decay of ^{16}C, 8: 44987 (J:US)
CARBON BLACK
Gasification
Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8: 43170 (R:US)
CARBON DIOXIDE
Air-Water Interactions
Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface, 8: 44742 (R:US)
Mass Transfer
Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface, 8: 44742 (R:US)
Monitoring
CO_2-based ventilation in buildings, 8: 44080 (R:XE:In French and English)
Phase Studies
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Displacement of oil by carbon dioxide. Annual report, October 1981-September 1982, 8: 43276 (R:US)
Photoacoustic Spectroscopy
Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios, 8: 44324 (R:US)
Potentials
Effective spherical potentials for molecular fluid thermodynamics, 8: 44303 (J:US)
Thermodynamic Properties
Effective spherical potentials for molecular fluid thermodynamics, 8: 44303 (J:US)
Uptake
Invasion of fossil-fuel CO_2 into the ocean, 8: 44729 (R:US)
CARBON DIOXIDE INJECTION
Bench-Scale Experiments
Displacement of oil by carbon dioxide. Annual report, October 1981-September 1982, 8: 43276 (R:US)
Field Tests
Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report, 8: 43272 (R:US)

Little Knife Field CO_2 minitest, Billings County, North Dakota. Final report. Volume 1. Technical report, 8: 43271 (R:US)
Fluid Injection
Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report, 8: 43272 (R:US)
Formation Damage
CO_2 formation damage study. Final report, 8: 43273 (R:US)
CARBON DIOXIDE LASERS
Wave Propagation
Pulse propagation properties in high-power CO_2 laser system for laser fusion, 8: 45227 (R:JP)
CARBON IONS
Collisions
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
Ionization
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
CARBON MONOXIDE
Bioconversion
Acidogenic bioconversion of C_1 compounds, 8: 43522 (J:US)
Corrosive Effects
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Excitation
Site-specific fragmentation of small molecules following soft—x-ray excitation, 8: 44896 (J:US)
Fragmentation
Site-specific fragmentation of small molecules following soft—x-ray excitation, 8: 44896 (J:US)
Lattice Vibrations
Reemitted-positron energy-loss spectroscopy: A novel probe of adsorbate vibrational levels, 8: 44304 (J:US)
S States
Site-specific fragmentation of small molecules following soft—x-ray excitation, 8: 44896 (J:US)
CARBON OXIDE SULFIDE
See CARBON OXYSULFIDE
CARBON OXIDES
See also CARBON DIOXIDE
CARBON MONOXIDE
Dissociation
Two photon laser induced fluorescence of carbon atoms, 8: 44882 (J:US)
CARBON OXYSULFIDE
Hydrolysis
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
CARBON STEELS
See also STEEL-ASTM-A533-B
Crack Propagation
Crack growth studies on a carbon steel in oxygenated high-pressure water at elevated temperatures, 8: 44189 (RA:US)
Mechanism of environmentally-controlled crack-growth of structural steels in high-temperature water, 8: 44185 (RA:US)
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8: 44188 (RA:US)
Hydrogen Embrittlement
Influence of hydrogen on pure iron and steel at medium and high pressure levels, 8: 44174 (R:DE:In German)
Materials Testing
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8: 44188 (RA:US)
CARBON TETRACHLORIDE
Radiolysis
Establishing a reaction model of the irradiated carbon tetrachloride/water system, 8: 44362 (B:DE:In German)
CARBONYL SULFIDE
See CARBON OXYSULFIDE
CARCINOMAS
Afterloading
Treatment of cancer of the uterus in developing countries: Proposals for a programme, 8: 44768 (R:XA)
CARIBBEAN SEA
Carbon Cycle
Technical report submitted to the Department of Energy, Washington, DC on determination of net CO_2 flux across air-sea interface, 8: 44742 (R:US)
CAROLINA POWER LIGHT ROBINSON-2 REACTOR
See ROBINSON-2 REACTOR
CASCADE (EXTRACTION)
See EXTRACTION COLUMNS
CASCADE IMPACTORS
Efficiency
Parameters influencing the collection efficiency of solid aerosols in cascade impactor, 8: 44634 (RA:DE)
CASKS
Autoradiography
Autoradiography of metallic matrices, 8: 43338 (R:CA)
Safety
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 1. Control modules, 8: 43408 (R:US)
Voids
Autoradiography of metallic matrices, 8: 43338 (R:CA)
CAST IRON
Metallography
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
CATALYSTS
Chemical Preparation
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8: 44349 (R:US)
Comparative Evaluations
Coal liquefaction technology development in NEDO, 8: 43156 (RA:US)
Deactivation
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Contribution to the study of reforming catalyst aging by coking, 8: 43284 (R:FR:In French)
Recovery
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)
CATALYTIC REFORMING
Catalysts
Contribution to the study of reforming catalyst aging by coking, 8: 43284 (R:FR:In French)
CATHODES
Thermal Spikes
Additive for iron disulfide cathodes used in thermal batteries, 8: 43980 (P:US)
CAVITIES
See also BOREHOLES
ROCK CAVERNS
Convection
Thermal response of a mass of fluid to a constant cooling rate applied on its boundaries, 8: 44413 (R:BR)
Heat Transfer
Two-phase flow and heat transfer in cavities, 8: 44410 (R:BR)
Two-Phase Flow
Two-phase flow and heat transfer in cavities, 8: 44410 (R:BR)
CAVITY RECEIVERS
Design
1/4-megawatt solar receiver. Final report, 8: 43535 (R:US)
Testing
1/4-megawatt solar receiver. Final report, 8: 43535 (R:US)
CAVITY RESONATORS
See also SUPERCONDUCTING CAVITY RESONATORS

Computerized Simulation
Implementation, of the superfish computer code in the CYBER computer system of IEAV (Instituto de Estudos Avancados) in Brazil, 8: 44469 (R:BR:In Portuguese)
CBA (BROOKHAVEN COLLIDING BEAM ACCELERATO
See ISABELLE STORAGE RINGS
CCD
See CHARGE-COUPLED DEVICES
CDTE SEMICONDUCTOR DETECTORS
Photoconductivity
Semiconductor receivers of the pulse X-radiation based on cadmium telluride, 8: 44614 (RA:SU:In Russian)
CE ENTRAINED FUEL PROCESS
Economic Analysis
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8: 43162 (R:US)
Mathematical Models
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8: 43162 (R:US)
Performance
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8: 43162 (R:US)
Process Development Units
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8: 43162 (R:US)
CELL GROWTH (ANIMAL)
See ANIMAL CELLS
CELL MEMBRANES
Electric Potential
Continuous fermentation: improvement of cell immobilization by zeta potential measurement, 8: 44784 (J:US)
CELLOBIOSE
Enzymatic Hydrolysis
Characterization of β-1,4-glucosidase activity in Thermoanaerobacter ethanolicus, 8: 44783 (J:US)
CELLS (ANIMAL)
See ANIMAL CELLS
CELLS (IMMOBILIZED)
See IMMOBILIZED CELLS
CELLS (REACTOR)
See REACTOR CELLS
CELLULASE
Code number 3.2.1.4.
Biosynthesis
Cellulase production in continuous and fed-batch culture by Trichoderma reesei MCG80, 8: 44782 (J:US)
CELLULASES
See CELLULASE
CELLULOSE
Acid Hydrolysis
Enzymatic hydrolysis of cellulose pretreated with zinc chloride and hydrochloric acid, 8: 43517 (J:US)
High-temperature acid hydrolysis of cellulose for alcohol fuel production, 8: 43454 (R:US)
Bioconversion
Growth and citirc-acid production by Candida guilliermondii using a cellulose substrate, 8: 43520 (J:US)
Enzymatic Hydrolysis
Enzymatic hydrolysis of cellulose pretreated with zinc chloride and hydrochloric acid, 8: 43517 (J:US)
Freeze-explosion technique for increasing cellulose hydrolysis, 8: 43516 (J:US)
Reactor optimization for enzymatic hydrolysis of cellulose, 8: 43461 (J:US)
Freezing
Freeze-explosion technique for increasing cellulose hydrolysis, 8: 43516 (J:US)
Heat Treatments
Enzymatic hydrolysis of cellulose pretreated with zinc chloride and hydrochloric acid, 8: 43517 (J:US)
High-temperature acid hydrolysis of cellulose for alcohol fuel production, 8: 43454 (R:US)
Radiolysis
Effect of γ-ray irradiation on sugar production from plant biomass, 8: 43519 (J:US)
Separation Processes
Enzymatic hydrolysis of cellulose pretreated with zinc chloride and hydrochloric acid, 8: 43517 (J:US)
CELLULOSE ESTERS
Chemical Radiation Effects
Preparation of permselective membranes by means of radiation induced grafting. Part of a coordinated programme on radiation modified polymers for biomedical and biochemical applications. Final report for the period 1 August 1980 - 31 August 1982, 8: 44360 (R:XA)
CENTRAL HEATING PLANTS
Environmental Effects
Effect of future centralized heating in Oslo on air quality. Pt. 1, 8: 44708 (R:NO:In Norwegian)
CENTRAL NERVOUS SYSTEM
See also BRAIN
Radiotherapy
Radiation therapy of tumours of the central nervous system, 8: 44774 (R:PL:In Polish)
CERAMICS
Structural Chemical Analysis
Microstructural characterization of simulated reactor waste forms, 8: 43381 (R:US)
CERIUM 148
Energy Levels
Levels in ^{148}Ce from the decay of mass separated ^{148}La, 8: 45026 (J:US)
CERIUM ALLOYS
Critical Temperature
Two critical points on the γ-α phase boundary of cerium alloys, 8: 44221 (J:US)
Phase Diagrams
Two critical points on the γ-α phase boundary of cerium alloys, 8: 44221 (J:US)
CERIUM COMPOUNDS
See also CERIUM OXIDES
Magnetic Susceptibility
Simple scaling behavior in the magnetic susceptibility of $CeSn_3$ under high pressure, 8: 44224 (J:US)
CERIUM OXIDES
Aerosol Monitoring
To the resuspension of cerium-IV-oxide powder aggregates and measurement of their mass distribution, 8: 44704 (RA:DE:In German)
CERMETS
Fabrication
Cermets and method for making same, 8: 44248 (P:US)
CESIUM
Atom-Atom Collisions
Two-state models of radiative collisions and related ionization effects (Cs + Cs; Xe + Ar), 8: 44904 (J:US)
Electron Emission
Electron emission from metal-film systems under atomic particle bombardment, 8: 44871 (RA:SU:In Russian)
CESIUM 137
Radioecological Concentration
Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors, 8: 44747 (R:DE:In German)
CESIUM CHLORIDES
Physical Radiation Effects
Kinetics of aggregation and annealing of defects in heavily X-irradiated alkali chloride crystals studied by positron annihilation, 8: 44316 (BA:NL)
Raman Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_3/KI-LiI, I_3/CsCl-LiCl, and I_3-ICl/CsCl-LiCl, 8: 44340 (J:US)
Ultraviolet Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_3/KI-LiI, I_3/CsCl-LiCl, and I_3-ICl/CsCl-LiCl, 8: 44340 (J:US)

CESIUM IODIDES
Lattice Parameters
Two zicronium iodide clusters. Hexazirconium dodecaiodide (Zr_6I_{12}) and cesium hexazirconium tetradecaiodide ($CsZr_6I_{14}$), 8: 44343 (J:US)
Structural Chemical Analysis
Two zicronium iodide clusters. Hexazirconium dodecaiodide (Zr_6I_{12}) and cesium hexazirconium tetradecaiodide ($CsZr_6I_{14}$), 8: 44343 (J:US)
CESIUM IONS
Collisions
Some aspects of the secondary ion emission from metals (Ti, V, Zr, Nb, Mo, Pd, Ta, W, Re, Ir, Pt), 8: 44867 (RA:SU:In Russian)
CHALKS
See LIMESTONE
CHANNELING
See also ELECTRON CHANNELING
ION CHANNELING
POSITRON CHANNELING
Distribution Functions
Theory of thermal dechanneling from axial channels, 8: 45045 (RA:SU:In Russian)
Fokker-Planck Equation
Theory of thermal dechanneling from axial channels, 8: 45045 (RA:SU:In Russian)
CHARGE-COUPLED DEVICES
Performance
Some characteristics of the CCD-321 instruments with charge connection, 8: 44632 (R:SU:In Russian)
CHARGED-PARTICLE ACTIVATION
See ACTIVATION ANALYSIS
CHARGED-PARTICLE TRANSPORT
Monte Carlo Method
Vectorized Monte Carlo for nonlinear radiation transport, 8: 45283 (J:US)
CHARGED-PARTICLE TRANSPORT THEORY
Stopping Power
Subshell formula for the Bethe-Born stopping approximation, 8: 45050 (J:US)
CHARM PARTICLES
Particle Production
Production of heavy quarks: A nonperturbative approach, 8: 44945 (J:US)
CHARPAK CHAMBERS
See MULTIWIRE PROPORTIONAL CHAMBERS
CHARS
Gasification
Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8: 43170 (R:US)
CHEMICAL DOSEMETERS
Calibration
Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982, 8: 44791 (R:XA)
CHEMICAL EFFLUENTS
Marine Disposal
Seawater scrubber effluent - an evaluation of possible ecological consequences, 8: 43199 (RA:DK)
Water Pollution
Seawater scrubber effluent - an evaluation of possible ecological consequences, 8: 43199 (RA:DK)
CHEMICAL FEEDSTOCKS
Chemical Composition
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
Production
Potential for chemicals from biomass, 8: 43515 (BA:US)
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
CHEMICAL MUTAGENS
See MUTAGENS
CHEMICAL OXYGEN DEMAND
Removal
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
CHEMICAL RADIATION DETECTORS
Testing
Investigation of polyethylene detector and adiabatic calorimeter in the radiation fields of proton accelerators, 8: 44573 (R:SU:In Russian)
CHEMICAL REACTION KINETICS
Chiral Symmetry
Chiral-symmetry breaking in nonequilibrium systems, 8: 45087 (J:US)
Diffusion
Derived sensitivity densities in chemical kinetics: A new computational approach with applications, 8: 44335 (J:US)
Transport Theory
Derived sensitivity densities in chemical kinetics: A new computational approach with applications, 8: 44335 (J:US)
CHEMICAL REACTORS
See also RETORTS
Control Systems
New approaches to the dynamics of nonlinear systems with implications for process and control system design, 8: 44372 (B:US)
Design
Advanced laboratory-scale extruder-reactor biomass liquefaction unit, 8: 43436 (RA:US)
Development of biomass gasification to produce substitute fuels, 8: 43428 (RA:US)
Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981, 8: 43191 (R:US)
Predictive model for stratified downdraft gasification of biomass, 8: 43429 (RA:US)
Equipment
Development of biomass gasification to produce substitute fuels, 8: 43428 (RA:US)
Mathematical Models
Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981 (F-T/ZSM-5 process), 8: 43423 (R:US)
CHEMICALS
See MUTAGENS
CHEMISTRY
See also PHOTOCHEMISTRY
SOIL CHEMISTRY
Research Programs
Program summaries for 1982 - Energy Sciences programs, 8: 45284 (R:US)
CHLORAMINE-B
See CHLORAMINES
CHLORAMINES
Chemical Effluents
Decomposition and transport of monochloramine in freshwater, 8: 44730 (RA:DK)
Decomposition
Decomposition and transport of monochloramine in freshwater, 8: 44730 (RA:DK)
CHLORAMINE-T
See CHLORAMINES
CHLORIDES
See also BARIUM CHLORIDES
CALCIUM CHLORIDES
CESIUM CHLORIDES
IODINE CHLORIDES
LITHIUM CHLORIDES
MAGNESIUM CHLORIDES
MERCURY CHLORIDES
POTASSIUM CHLORIDES
RUBIDIUM CHLORIDES
SODIUM CHLORIDES
STRONTIUM CHLORIDES
Aerosol Monitoring
Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling, 8: 44675 (RA:DE)
Environmental Transport
Sulphur and chloride deposition and ecosystem transport in a strongly acidified lake watershed, 8: 44735 (RA:DK)
CHLORINATED ALIPHATIC HYDROCARBONS
See also CARBON TETRACHLORIDE
PVC

Dissociation
Infrared multiphoton dissociation of 1-chloro-1-fluoro ethylene: Competitive reactions and pressure dependence, 8: 44885 (J:US)

CHLORINATION
Environmental Impacts
Discontinuous mass chlorination of natural draft cooling towers, 8: 44740 (RA:DK)
Reviews
Chlorination of cooling waters-mechanism, 8: 43208 (RA:DK)

CHLORINE 34
Beta-Plus Decay
^{34}Cl superallowed β decay, 8: 44994 (J:US)

CHLORINE IODIDES
See IODINE CHLORIDES

CHLOROPHYLL
Biosynthesis
Chloroplast bioengineering: the greening of chloroplasts in vitro, 8: 43526 (J:US)

CHORDATES
See VERTEBRATES

CHROMIUM
Auger Effect
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Autoionization
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Electron Collisions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Energy-Level Transitions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Recycling
Chlorine-extraction processes for energy-conserving recovery of nonferrous metals, 8: 44104 (R:US)

CHROMIUM 51
Atom Transport
Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel, 8: 44262 (R:US)
Diffusion
Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel, 8: 44262 (R:US)
Grain boundary and surface diffusion in oxide systems. Technical progress report, 8: 44243 (R:US)

CHROMIUM ALLOYS
See also INCONEL ALLOYS
STAINLESS STEELS
Physical Radiation Effects
Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983, 8: 44133 (R:US)

CHROMIUM OXIDES
Curie Point
Positron annihilation studies of phase transitions in ferromagnetic and antiferromagnetic crystals, 8: 44233 (BA:NL)

CHROMIUM SILICIDES
Charge Density
Physical content of electron-charge-density distributions in A15 compounds, 8: 44308 (J:US)

CHROMIUM-MOLYBDENUM STEELS
See also ALLOY-HT-9
STEEL-15KH11MFA
Creep
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Fatigue
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Fracture Properties
Study of the effects of austenitizing and tempering heat treatments on the alloy HT-9, 8: 44135 (R:US)
Heat Treatments
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Mechanical Properties
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983, 8: 44132 (R:US)
Microstructure
Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983, 8: 44132 (R:US)

CHROMIUM-NICKEL STEELS
See also STAINLESS STEEL-304
Corrosion
Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures, 8: 43810 (R:DE:In German)

CHROMODYNAMICS
See QUANTUM CHROMODYNAMICS

CITIES
See URBAN AREAS

CITRIC ACID
Production
Growth and citirc-acid production by Candida guilliermondii using a cellulose substrate, 8: 43520 (J:US)

CLOSTRIDIUM
Cellulolytic Activity
Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8: 43439 (R:US)

CLOSURES
Seals
Investigations of glands for valves and slides for gases, 8: 43732 (R:DE:In German)

CLUSTERS (FUEL ELEMENTS)
See FUEL ELEMENT CLUSTERS

CO2 FLOODING
See CARBON DIOXIDE INJECTION

COAL
See also BLACK COAL
BROWN COAL
Ashes
Analytical instruments in the coal preparation industry: current status and development needs, 8: 43256 (J:US)
Bench-Scale Experiments
NO sub (x) formation from different coal types in a bench scale reactor under excess air and staged combustion conditions. Final report, 8: 43264 (R:SE)
Calorific Value
Analytical instruments in the coal preparation industry: current status and development needs, 8: 43256 (J:US)
Chemical Composition
Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District, 8: 43192 (R:DE:In German)
Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981, 8: 43191 (R:US)
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
Coal Preparation
Quality coal for electric utility use (USA; electric utilities; to 1990 and 1995), 8: 43726 (RA:US)
Combustion
Analysis of alternative fuel price trajectories. Appendix B. Results of analysis of MFBI data using natural logarithms, 8: 43262 (R:US)
Combustion Products
Determination of human exposure using measured data of Cd, As and Pb, 8: 43241 (R:NO)

Effect of coal burning on contamination of regional resources of underground water, 8: 44738 (RA:DK)
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8: 44659 (R:US)
NO sub (x) formation from different coal types in a bench scale reactor under excess air and staged combustion conditions. Final report, 8: 43264 (R:SE)

Comparative Evaluations
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)

Consumption Rates
Quality coal for electric utility use (USA; electric utilities; to 1990 and 1995), 8: 43726 (RA:US)

Conversion
Program summaries for 1982 - Energy Sciences programs, 8: 45284 (R:US)

Density
Analytical instruments in the coal preparation industry: current status and development needs, 8: 43256 (J:US)

Desulfurization
Bacterial coal desulfurization, 8: 43187 (J:US)

Devolatilization
Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981, 8: 43191 (R:US)

Energy Analysis
Coal distribution, January-March 1983, 8: 44035 (R:US)

Environmental Impacts
Water pollution arising from solid waste (coal, fly ash, slag) disposal, and measures to prevent water pollution, 8: 44739 (RA:DK)

Flotation
Modelling and control of blackwater treatment in coal preparation, 8: 43254 (R:US)

Fluidized-Bed Combustion
Planning, construction and operation of the 6 MWsub(th)-test facility Koenig Ludwig for firing bituminous coal in an atmospheric fluidized bed furnace, 8: 43257 (R:DE:In German)

Hydraulic Transport
Experimental investigation of interfacial shear in large-particle-coal hydrotransport, 8: 43255 (R:US)

Hydrogenation
First experiences and results of the 200 T/D pilot plant Bottrop, 8: 43155 (RA:US)

Laser-Radiation Heating
Coal pyrolysis under rapid heating with a c-w laser, 8: 43161 (R:US)

Market
Increased opportunities for coal in industrial markets (USA; 1930 to 1982), 8: 43265 (RA:US)
Strategic analysis. A proposal for a method of investigation illustrated by the future competing situation of coal with biomass fuels, 8: 43266 (R:SE:In Swedish)

Marketing
Quality coal for electric utility use (USA; electric utilities; to 1990 and 1995), 8: 43726 (RA:US)

Materials Handling
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)

Mathematical Models
Experimental investigation of interfacial shear in large-particle-coal hydrotransport, 8: 43255 (R:US)

Moisture
Analytical instruments in the coal preparation industry: current status and development needs, 8: 43256 (J:US)

Performance Testing
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)

Physical Properties
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)

Prices
Increased opportunities for coal in industrial markets (USA; 1930 to 1982), 8: 43265 (RA:US)

Pyrolysis
Coal pyrolysis under rapid heating with a c-w laser, 8: 43161 (R:US)
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)

Recovery
Modelling and control of blackwater treatment in coal preparation, 8: 43254 (R:US)

Storage Facilities
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)

Structural Chemical Analysis
Investigation of coal devolatilization: kinetics and product characterization. First quarterly report, 23 March 1981-23 May 1981, 8: 43191 (R:US)

Sulfur Content
Analytical instruments in the coal preparation industry: current status and development needs, 8: 43256 (J:US)

Water Pollution
Effect of coal burning on contamination of regional resources of underground water, 8: 44738 (RA:DK)

COAL CHEMICALS
See COAL EXTRACTS

COAL DEPOSITS
See also COAL SEAMS

Degassing
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)
Methane drainage from coal seams by surface drillings, 8: 43188 (R:DE:In German)

Exploration
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Development of the seam, 8: 43251 (R:DE:In German)
State of New York peat-resource inventory. Volume II, 8: 43246 (R:US)

Sampling
Systematic studies on coals of different deposits, including their mineral matter, 8: 43190 (R:DE:In German)

COAL EXTRACTS

Pyrite
Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District, 8: 43192 (R:DE:In German)

COAL FINES

Agglomeration
Coal-gasification basic research and cost studies. Quarterly report 2, 8: 43168 (R:US)

Briquetting
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8: 43167 (R:US)
Coal-gasification basic research and cost studies. Quarterly report 2, 8: 43168 (R:US)

COAL GASIFICATION
See also BI-GAS PROCESS
CE ENTRAINED FUEL PROCESS
EXXON GASIFICATION PROCESS
KOPPERS-TOTZEK PROCESS
LURGI PROCESS
LURGI SLAGGING PROCESS
RUHR 100 GASIFICATION PROCESS
TEXACO GASIFICATION PROCESS
U-GAS PROCESS
WELLMAN-GALUSHA PROCESS
WESTINGHOUSE GASIFICATION PROCESS

Bench-Scale Experiments
Experiments and model calculations on pyrolysis and gasification of Rhenish lignite in an inclined revolving pipe, 8: 43183 (R:DE:In German)
Catalysts
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8: 43170 (R:US)
Chemical Reaction Kinetics
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
Chemical Reactors
Coal gasification support studies. Vol. II, Task 2. Studies of fluidized-bed reactors in coal gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43171 (R:US)
Demonstration Plants
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Environmental Effects
Overview of gasification technology, 8: 43179 (RA:US)
Environmental Impacts
Coal conversion solid waste disposal (Cogas, British Gas/Lurgi, Grace/Texaco, U-Gas, SRC-I/Kopper-Totzek, SRC-II/Texaco, Foster Wheeler/Stoic, Combustion Engineering), 8: 43221 (J:US)
Evaluation
Environmental pollution control research activities, 8: 43226 (RA:US)
Feasibility Studies
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
Fluidized Bed
Coal gasification support studies. Vol. II, Task 2. Studies of fluidized-bed reactors in coal gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43171 (R:US)
Mathematical Models
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process. Quarterly report, 29 June 1981-27 September 1981, 8: 43166 (R:US)
Meetings
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Optimization
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Pollution Control
Environmental pollution control research activities, 8: 43226 (RA:US)
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
Research Programs
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Solid Wastes
Coal conversion solid waste disposal (Cogas, British Gas/Lurgi, Grace/Texaco, U-Gas, SRC-I/Kopper-Totzek, SRC-II/Texaco, Foster Wheeler/Stoic, Combustion Engineering), 8: 43221 (J:US)
Technology Assessment
Overview of gasification technology, 8: 43179 (RA:US)
Test Facilities
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process. Quarterly report, 29 June 1981-27 September 1981, 8: 43166 (R:US)
Waste Processing
Scale-up procedures for a Scheibel extraction column, 8: 43218 (R:US)
Waste Water
Anaerobic biological treatment of coal gasifier effluent, 8: 43446 (J:US)

COAL GASIFICATION PLANTS
By-Products
Business criteria for coal gasification, 8: 43158 (RA:US)
Capitalized Cost
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8: 43167 (R:US)
Commercialization
Coal gasification at Caterpillar's York, Pennsylvania, plant, 8: 43180 (RA:US)
Corrosion
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Demonstration Plants
Business criteria for coal gasification, 8: 43158 (RA:US)
Design
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
Coal-gasification basic research and cost studies. Quarterly report 2, 8: 43168 (R:US)
Environmental issues in planning a medium-Btu coal gasification plant serving industries: a case history in Philadelphia, 8: 43230 (RA:US)
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Economic Analysis
Business criteria for coal gasification, 8: 43158 (RA:US)
Economics
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Environmental Effects
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Environmental effects of coal gasification, 8: 43263 (RA:US)
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Environmental control technology for aqueous effluents, 8: 43237 (RA:US)
Environmental control technology for gaseous emissions, 8: 43238 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Environmental Impacts
Environmental issues in planning a medium-Btu coal gasification plant serving industries: a case history in Philadelphia, 8: 43230 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)

Erosion
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Financing
Business criteria for coal gasification, 8: 43158 (RA:US)
Flue Gas
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Fly Ash
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Fuel Feeding Systems
Development of a continuous feeding system for coal dust pressure gasification, 8: 43146 (R:DE:In German)
Project study of prototype plant for the VEW-coal-conversion-process (pressure operation), 8: 43147 (R:DE:In German)
Gaseous Wastes
Environmental effects of coal gasification, 8: 43263 (RA:US)
Environmental control technology for gaseous emissions, 8: 43238 (RA:US)
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Health Hazards
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Liquid Wastes
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Modifications
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Operating Cost
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8: 43167 (R:US)
Coal gasification at Caterpillar's York, Pennsylvania, plant, 8: 43180 (RA:US)
Operation
Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process. Quarterly report, 29 June 1981-27 September 1981, 8: 43166 (R:US)
Permit Applications
Business criteria for coal gasification, 8: 43158 (RA:US)
Planning
Environmental issues in planning a medium-Btu coal gasification plant serving industries: a case history in Philadelphia, 8: 43230 (RA:US)
Pollution Control
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Environmental issues and research program data needs suggested by the results of the Kosovo test program, 8: 43232 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Pollution Regulations
Overview of pollution control requirements for the US gasification industry, 8: 43267 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Refractories
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Reliability
Business criteria for coal gasification, 8: 43158 (RA:US)
Solid Wastes
Environmental effects of coal gasification, 8: 43263 (RA:US)
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Solid waste management, 8: 43219 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Waste Water
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)
Environmental effects of coal gasification, 8: 43263 (RA:US)
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Environmental control technology for aqueous effluents, 8: 43237 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)

COAL INDUSTRY
Environmental Impacts
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)

COAL LIQUEFACTION
See also BERGIUS PROCESS
H-COAL PROCESS
TSL PROCESS
Catalysts
Coal liquefaction technology development in NEDO (Japan), 8: 43156 (RA:US)
Demonstration Plants
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Environmental Effects
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)
Meetings
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Research Programs
Coal liquefaction technology development in NEDO (Japan), 8: 43156 (RA:US)
Waste Water
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)

COAL LIQUEFACTION PLANTS
Air Pollution
Potential ecological hazards of H-Coal liquefaction, 8: 43222 (R:US)
Commercialization
Coal liquefaction and heavy oil conversion minimizing of environmental impact results from Veba Oel prefeasibility study, 8: 43236 (RA:US)
Design
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
SRC-I technology and its economics, 8: 43150 (RA:US)
Economic Analysis
SRC-I technology and its economics, 8: 43150 (RA:US)
Economics
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
SRC-I technology and its economics, 8: 43150 (RA:US)
Environmental Effects
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Environmental control technology for gaseous emissions, 8: 43238 (RA:US)

Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Environmental Impacts
Coal liquefaction and heavy oil conversion minimizing of environmental impact results from Veba Oel prefeasibility study, 8: 43236 (RA:US)
Feasibility Studies
Coal liquefaction and heavy oil conversion minimizing of environmental impact results from Veba Oel prefeasibility study, 8: 43236 (RA:US)
Gaseous Wastes
Environmental control technology for gaseous emissions, 8: 43238 (RA:US)
Land Pollution
Potential ecological hazards of H-Coal liquefaction, 8: 43222 (R:US)
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Optimization
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Pollution Control
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Refractories
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Residues
First experiences and results of the 200 T/D pilot plant Bottrop, 8: 43155 (RA:US)
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
SRC-I technology and its economics, 8: 43150 (RA:US)
Water Pollution
Potential ecological hazards of H-Coal liquefaction, 8: 43222 (R:US)

COAL LIQUIDS
Chemical Composition
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Chemical Properties
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Deashing
Coal liquefaction technology development in NEDO, 8: 43156 (RA:US)
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Fractionation
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Heterocyclic Compounds
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Hydrogenation
Coal liquefaction technology development in NEDO, 8: 43156 (RA:US)
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Mutagen Screening
Health effects studies, 8: 43227 (RA:US)
Physical Properties
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Refining
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)

COAL MINES
Design
Development of the seam, 8: 43251 (R:DE:In German)

COAL MINING
Economic Policy
Coal exploration in the Netherlands. A research proposal, 8: 43243 (R:NL:In Dutch)
Waste Management
Dirt management in Ruhr coal mines, 8: 43220 (R:DE:In German)

COAL PREPARATION
Washing
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)

COAL PREPARATION PLANTS
Environmental Effects
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
On-Line Measurement Systems
Analytical instruments in the coal preparation industry: current status and development needs, 8: 43256 (J:US)
Pollution Control
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Waste Water
Modelling and control of blackwater treatment in coal preparation, 8: 43254 (R:US)

COAL SEAMS
Degassing
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)

COAL-DERIVED LIQUIDS
See COAL LIQUIDS

COAL-OIL MIXTURES
See COAL
FUEL OILS
FUEL SLURRIES

COALTEK PROCESS
See FUEL FEEDING SYSTEMS

COATED FUEL PARTICLES
Fabrication
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Performance Testing
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Specifications
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
Stress Analysis
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)

COBALT
Catalytic Effects
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Fermi Level
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8: 44197 (R:US)

COBALT COMPLEXES
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)

COGENERATION
Prior to November 1980, this concept was indexed to CO-GENERATION.
See COGENERATION

Feasibility Studies
Review of a report Industrial Cogeneration Potential (1980 to 2000). Phase II. Peer review and application of a data base, 8: 44094 (R:US)
Uses
New solution of energy problems for industrial operation by cogeneration, 8: 44093 (R:DE:In German)
COKING
Recommendations
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8: 43189 (R:DE:In German)
COKING PLANTS
Waste Product Utilization
First experiences and results of the 200 T/D pilot plant Bottrop, 8: 43155 (RA:US)
COLD PLASMA
Whistlers
Emission, absorption, and tunneling of whistler waves in an inhomogeneous magnetic field, 8: 45178 (J:US)
COLLECTIVE ACCELERATORS
See also ELECTRON-RING ACCELERATORS
Computerized Simulation
Numerical simulation of collective ion acceleration, 8: 44475 (RA:CS)
COLLEGES
See EDUCATIONAL FACILITIES
COLLIERIES
See COAL MINES
COLLISIONAL PLASMA
Diffusion
Nonintrinsic ambipolar diffusion in turbulence theory, 8: 45172 (J:US)
Fokker-Planck Equation
Magnetic scalar potentials, 8: 45133 (RA:CS)
COLOGNE SPIRITS
See ETHANOL
COLORADO
Magnetic Surveys
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area, 8: 43315 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area, 8: 43316 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area, 8: 43317 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area, 8: 43318 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area, 8: 43319 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area, 8: 43321 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area, 8: 43322 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area, 8: 43323 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report, 8: 43324 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report, 8: 43314 (R:US)
Radiometric Surveys
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area, 8: 43315 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area, 8: 43316 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area, 8: 43317 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area, 8: 43318 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area, 8: 43319 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II A. Detail area, 8: 43320 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area, 8: 43321 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area, 8: 43322 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area, 8: 43323 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report, 8: 43324 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report, 8: 43314 (R:US)
Uranium Deposits
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area, 8: 43315 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area, 8: 43316 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area, 8: 43317 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area, 8: 43318 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area, 8: 43319 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II A. Detail area, 8: 43320 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area, 8: 43321 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area, 8: 43322 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area, 8: 43323 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report, 8: 43324 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report, 8: 43314 (R:US)
COLORIMETRIC DOSEMETERS
Uses
Investigation of possibility for using color threshold detectors in the determination of accelerated ion fluence, 8: 44598 (R:SU:In Russian)
COLUMBIUM
See NIOBIUM
COLUMNS (EXTRACTION)
See EXTRACTION COLUMNS
COLUMNS (MECHANICAL)
See MECHANICAL STRUCTURES
COMBINED GAS AND STEAM CYCLE POWER PLANTS
See COMBINED-CYCLE POWER PLANTS
COMBINED STEAM-POWER GENERATION
See COGENERATION

COMBINED-CYCLE POWER PLANTS
Prior to March, 1976, the descriptors COMBINED CYCLES and FOSSIL-FUEL POWER PLANTS or THERMAL POWER PLANTS were used for indexing this concept.
Demonstration Plants
Business criteria for coal gasification, 8: 43158 (RA:US)
Financing
Business criteria for coal gasification, 8: 43158 (RA:US)
Fuels
Fuel quality/processing study. Volume IV. On-site processing studies, 8: 43177 (R:US)
Permit Applications
Business criteria for coal gasification, 8: 43158 (RA:US)
Reliability
Business criteria for coal gasification, 8: 43158 (RA:US)
COMBUSTION
See also FLUIDIZED-BED COMBUSTION
Additives
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Test Facilities
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
COMBUSTION ENGINEERING GASIFICATION PROCE
See CE ENTRAINED FUEL PROCESS
COMBUSTION PRODUCTS
Air Pollution
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Chemical Analysis
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Health Hazards
Determination of human exposure using measured data of Cd, As and Pb, 8: 43241 (R:NO)
Spatial Distribution
Spatial distribution of the trace element emission from conventional thermal power plants in Europe, 8: 44682 (R:NO)
COMMERCIAL BUILDINGS
Daylighting
Design of passive commercial buildings: background and major lessons learned, 8: 43590 (RA:US)
DOE Passive Commercial Demonstration Program update report, 8: 43604 (RA:US)
Passive solar bank building in Minnesota, 8: 43608 (RA:US)
Energy Conservation
Energy conservation in buildings, 8: 44077 (R:NL:In Dutch)
Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience, 8: 44074 (R:US)
Hybrid Systems
Toward passive and hybrid solar commercial buildings, 8: 43589 (RA:US)
Passive Solar Heating Systems
Building energy analysis of integrated passive designs, 8: 43601 (RA:US)
Design of passive commercial buildings: background and major lessons learned, 8: 43590 (RA:US)
Design of passive commercial buildings, 8: 44063 (RA:US)
DOE Passive Commercial Demonstration Program update report, 8: 43604 (RA:US)
Passive solar bank building in Minnesota, 8: 43608 (RA:US)
Selected strategies and results from Commercial Buildings Design and Demonstration Program (PON), 8: 43593 (RA:US)
Solar Cities and Towns Program, 8: 43487 (RA:US)
Toward passive and hybrid solar commercial buildings, 8: 43589 (RA:US)
COMMERCIAL SECTOR
Energy Analysis
Total energy requirements of shopping for food (Supermarkets, Grocery Stores, Dairies, Butcheries, New Zealand), 8: 44048 (R:NZ)
Total energy requirements of food retailing (Grocery Stores, Supermarkets, Dairies, Butcheries, New Zealand), 8: 44047 (R:NZ)
Energy Audits
Total energy requirements of shopping for food (Supermarkets, Grocery Stores, Dairies, Butcheries, New Zealand), 8: 44048 (R:NZ)
Total energy requirements of food retailing (Grocery Stores, Supermarkets, Dairies, Butcheries, New Zealand), 8: 44047 (R:NZ)
COMMUNITIES
See also PLANNED COMMUNITIES
Cogeneration
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
District Heating
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
Economic Development
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I, 8: 44109 (R:US)
Energy Supplies
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I, 8: 44109 (R:US)
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
Resource Recovery Facilities
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
COMMUNITIES (ECOLOGICAL)
See ECOSYSTEMS
COMPARATIVE EVALUATIONS
To be indexed in coordination with the concepts being compared.
Mechanical Vibrations
Semi-analytical study of the vibrations induced by flow in the piping of nuclear power plants, 8: 43774 (R:BR:In Portuguese)
Pipelines
Semi-analytical study of the vibrations induced by flow in the piping of nuclear power plants, 8: 43774 (R:BR:In Portuguese)
COMPOSITE MATERIALS
See also CERMETS
Fabrication
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Stresses
Stresses and deformations in laminated test specimens of carbon fiber reinforced composites, 8: 44257 (R:DE)
COMPOUNDS (ORGANIC)
See ORGANIC COMPOUNDS
COMPRESSIBLE FLOW
Finite Element Method
Finite element method for an ultra compressible flow, 8: 43853 (R:FR)
Rayleigh-Taylor Instability
Finite size fluid particle in nonuniform moving grid, 8: 45111 (R:JP)
Simulation
Simulation of gas compressible flow by free surface water flow, 8: 44905 (R:BR:In Portuguese)
Viscosity
Finite size fluid particle in nonuniform moving grid, 8: 45111 (R:JP)
COMPUTER CODES
Computer codes are indexed by their initial letter and CODES, e.g., A CODES. If the code name begins with a number the code is indexed to NUMBER CODES.
See also B CODES
R CODES
A Codes
ACTIV-computer code for automatic processing of γ-ray spectra, 8: 45298 (R:SU:In Russian)
ATOM graphic package. Curve plotting, 8: 45292 (R:SU:In Russian)

First accident simulation of Angra-1 power plant using the ALMOD computer code, 8: 43913 (RA:BR:In Portuguese)
C Codes
CHEMTRN user's manual, 8: 44744 (R:US)
D Codes
Continued development and physical validation of computer program DEROB, 8: 43574 (RA:US)
E Codes
EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms, 8: 43766 (R:SU:In Russian)
F Codes
A one-dimensional hybrid code for FRM startup, 8: 45281 (J:US)
FORSITE, a multiple-project management system: production of critical-path development schedules for geothermal electric-power-generation projects, 8: 43663 (R:US)
G Codes
Computer program GANBEO, 8: 43299 (R:DE:In German)
GMINC: a mesh generator for flow simulations in fractured reservoirs, 8: 43269 (R:US)
H Codes
Comparative characteristics of programs for statistical distribu-- tion collection in the HBOOK system, 8: 45296 (R:SU:In Russian)
I Codes
Texture analysis on the base of incomplete pole figures. Mathematical substantiation and the ICPOFI program description, 8: 45300 (R:SU:In Russian)
M Codes
Adaptation of TOODEE-2 computer code for reflood analysis in Angra-1 reactor (FLECHT experiments), 8: 43916 (RA:BR:In Portuguese)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description (PWR), 8: 43897 (R:GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes (PWR), 8: 43898 (R:GB)
Metacad programmer's guide, 8: 45310 (R:US)
N Codes
Preparation of the constant library in the NEKTAR-M program using the files of evaluated neutron data, 8: 43790 (R:SU:In Russian)
R Codes
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
The benchmarking of RADTRAN II, 8: 43335 (R:US)
S Codes
National Air Data Branch: NEDS/SAROAD, 8: 44709 (RA:US)
National water quality control information system (STORET), 8: 44753 (RA:US)
T Codes
TEDIT, a computer code for studying the time evolution of drift instabilities in a torus, 8: 45146 (R:US)
TRIPOLI.2. A 3D Monte Carlo system for thermal reactor applications, 8: 43758 (R:FR)
U Codes
Accident consequences and risk assessments based on the probabilistic safety study of a nuclear power plant with a high temperature reactor (HTR-1160), 8: 43927 (R:DE:In German)
Investigations on the transient version of URANUS, 8: 43925 (RA:DE:In German)
Present state of the URANUS code, 8: 43811 (RA:DE:In German)
UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems, 8: 45057 (TG:US)
URANUS investigations on coolant channel temperature for Mol 7c, 8: 43924 (RA:DE:In German)
Use of the URANUS code at Karlsruhe Nuclear Research Center, 8: 43926 (RA:DE:In German)
Validation
Continued development and physical validation of computer program DEROB, 8: 43574 (RA:US)

COMPUTER GRAPHICS
Computer Codes
Atom graphic package. Space object plotting, 8: 45293 (R:SU:In Russian)
ATOM graphic package. Curve plotting, 8: 45292 (R:SU:In Russian)
COMPUTER LANGUAGES
See PROGRAMMING LANGUAGES
COMPUTER NETWORKS
Syntax and semantics of a LINCS control monologue, 8: 45314 (R:US)
COMPUTER OUTPUT DEVICES
Electron Beams
Plotting CV drawings on an electron-beam recorder, 8: 45317 (R:US)
COMPUTER PROGRAMS
See COMPUTER CODES
COMPUTERS
See also DEC COMPUTERS
ES COMPUTERS
MICROPROCESSORS
SIEMENS COMPUTERS
Comparative Evaluations
Los Alamos National Laboratory computer benchmarking 1982, 8: 45303 (R:US)
Cost
Commercial timesharing costs at the Federal Energy Regulatory Commission, 8: 45289 (R:US)
Technology Assessment
Large computer facilities, 8: 45288 (RA:US)
CONCRETE BLOCKS
Phase Change Materials
Phase change materials in masonry construction, 8: 43650 (RA:US)
CONDENSATION NUCLEI
Flowmeters
Analysis of continuous flow condensation nuclei counters, 8: 44669 (RA:DE)
CONDENSED AROMATICS
See also ANTHRACENE
NAPHTHALENE
PHENANTHRENE
Chemical Reactions
Post-shock chemical and ESR analysis of acrylamide and selected anthracene derivatives (9-cyanoanthracene), 8: 44351 (R:US)
CONDUCTIVITY (ELECTRIC)
See ELECTRIC CONDUCTIVITY
CONING
See CHANNELING
CONNECTICUT YANKEE REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
Reactor Operation
Integrated Plant Safety Assessment: Systematic Evaluation Program. Haddam Neck Plant, Connecticut Yankee Atomic Power Company, Docket No. 50-213. Final report, 8: 43932 (R:US)
Reactor Safety
Integrated Plant Safety Assessment: Systematic Evaluation Program. Haddam Neck Plant, Connecticut Yankee Atomic Power Company, Docket No. 50-213. Final report, 8: 43932 (R:US)
CONSERVATION (ENERGY)
See ENERGY CONSERVATION
CONSERVATION (RESOURCE)
See RESOURCE CONSERVATION
CONSUMERS MICHIGAN PALISADES REACTOR
See PALISADES-1 REACTOR
CONTACT RADIOTHERAPY
See RADIOTHERAPY
CONTACTORS
See SWITCHES

CONTAINMENT BUILDINGS
Energy Transport
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8: 43911 (R:DE:In German)
Mass Transfer
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8: 43911 (R:DE:In German)
Photoelasticity
Photoelastic study of the effects of an impulsive seismic wave on a nuclear containment vessel, 8: 43855 (R:BR)
Pressure Gradients
Hydrogen combustion characteristics related to reactor accidents (PWR; BWR), 8: 43935 (R:US)
Seismic Effects
Photoelastic study of the effects of an impulsive seismic wave on a nuclear containment vessel, 8: 43855 (R:BR)
Stress Analysis
Consensus estimation study of nuclear power plant structural loads, 8: 43944 (R:US)
First-excursion problems for Gaussian vector processes, 8: 43943 (R:US)

CONTAINMENT SYSTEMS
Pressure Gradients
Hydrogen-burn analyses of ice-condenser containments (PWR;BWR), 8: 43942 (R:US)
Temperature Gradients
Hydrogen-burn analyses of ice-condenser containments (PWR;BWR), 8: 43942 (R:US)

CONTINENTAL SHELF
Energy Source Development
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. I. Final environmental-impact statement OCS Sale No. 73, 8: 43288 (R:US)
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. II. Final environmental-impact statement OCS Sale No. 73, 8: 43289 (R:US)
Environmental Impact Statements
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. I. Final environmental-impact statement OCS Sale No. 73, 8: 43288 (R:US)
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. II. Final environmental-impact statement OCS Sale No. 73, 8: 43289 (R:US)
Land Leasing
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. I. Final environmental-impact statement OCS Sale No. 73, 8: 43288 (R:US)
Proposed 1983 Outer Continental Shelf oil and gas lease sale offshore central California. Vol. II. Final environmental-impact statement OCS Sale No. 73, 8: 43289 (R:US)

CONTROL SYSTEMS
For automated processes including feedback.
See also REACTOR CONTROL SYSTEMS
Real Time Systems
Investigation into the organisation and structural design of multi-computer process-control systems, 8: 44633 (R:ZA)

CONTROL THEORY (REACTOR)
See REACTOR KINETICS

CONVECTION
See also FORCED CONVECTION
NATURAL CONVECTION
Numerical Solution
Thermal response of a mass of fluid to a constant cooling rate applied on its boundaries, 8: 44413 (R:BR)

COOK INLET
See GULF OF ALASKA

COOLANT LOOPS
For reactors use REACTOR COOLING SYSTEMS or IN PILE LOOPS.
Thermal Analysis
Simulation of thermal transients using CSMP, 8: 44416 (R:BR:In Portuguese)
Transients
Simulation of thermal transients using CSMP, 8: 44416 (R:BR:In Portuguese)

COOLERS
See HEAT EXCHANGERS

COOLING SYSTEMS
See also COOLANT LOOPS
Thermal Pollution
Measurement of jet propagation in the intermediate near-field of a coolant water outlet, 8: 44751 (R:DE:In German)

COOLING TOWERS
Environmental Impacts
Impacts of evaporative cooling towers in arid environments, 8: 43737 (J:GB)
Heat Transfer
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model, 8: 44431 (R:US)
Hybrid Systems
Investigations on operational behaviour of hybrid cooling towers, 8: 43731 (R:DE:In German)
Mass Transfer
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model, 8: 44431 (R:US)
Mathematical Models
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model, 8: 44431 (R:US)
Open-Cycle Cooling Systems
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 1. Formulation of a heat/mass transfer model, 8: 44431 (R:US)
Operation
Investigations on operational behaviour of hybrid cooling towers, 8: 43731 (R:DE:In German)

COORDINATED RESEARCH PROGRAMS
Research based on a common plan but carried out in various locations. To be used in coordination with institutions or countries involved.
European Communities
Evaluation of research and development. Methods for evaluating the results of European Community R + D programmes, 8: 44011 (R:XE:In French)
Meetings
Evaluation of research and development. Methods for evaluating the results of European Community R + D programmes, 8: 44011 (R:XE:In French)

COPPER
Atom Collisions
Energy spectra of neutral particles measured with the time-of-flight and the stripping techniques, 8: 44854 (RA:SU)
Auger Effect
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Auger Electron Spectroscopy
Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8: 44205 (J:US)
Autoionization
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Cathode Sputtering
Influence of surface microstructure on cathode sputtering of metals in the near threshold energy range, 8: 44851 (RA:SU:In Russian)
Charged-Particle Transport
Observation of large deviations from the Bethe-Bloch formula for relativistic uranium ions, 8: 45052 (J:US)
Crystal Defects
Development of pits and cones on ion bombarded copper, 8: 44142 (RA:SU)
Deposition
Copper plating of iron and steel wires by cementation, 8: 44240 (TJ:US)
Displacement Rates
Computer simulation of displacement cascades in copper, 8: 44139 (R:US)

Electron Collisions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Electron Diffraction
Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8: 44205 (J:US)
Energy-Level Transitions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Ion Collisions
Comparison of secondary electron yields from accelerated water cluster ions (M/z<50 000) striking Al_2O_3 and copper surfaces, 8: 44202 (J:US)
Energy and charge distributions in scattered particle flux under 5-60 keV hydrogen ion bombardment of copper target, 8: 44855 (RA:SU:In Russian)
Ion Emission
Orientational dependence od secondary ion emission in the direction of close packing, 8: 44866 (RA:SU:In Russian)
Kaon Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Physical Radiation Effects
Computer simulation of displacement cascades in copper, 8: 44139 (R:US)
Development of pits and cones on ion bombarded copper, 8: 44142 (RA:SU)
Formation of excited H by impact of H_1^+, H_2^+, H_3^+ ions on metal surfaces, 8: 44145 (RA:SU)
Radiation hardening and creep of metals, 8: 44163 (RA:SU:In Russian)
Pion Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Positrons
Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8: 44205 (J:US)
Proton Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Recycling
Chlorine-extraction processes for energy-conserving recovery of nonferrous metals, 8: 44104 (R:US)
Secondary Emission
Comparison of secondary electron yields from accelerated water cluster ions (M/z<50 000) striking Al_2O_3 and copper surfaces, 8: 44202 (J:US)
Orientational dependence od secondary ion emission in the direction of close packing, 8: 44866 (RA:SU:In Russian)
Sputtering
Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal, 8: 44865 (RA:SU)
Scattering and sputtering under bombardment of a monocrystal by a gliding ion beam, 8: 44857 (RA:SU)
Surface Properties
Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8: 44144 (RA:SU:In Russian)

COPPER ALLOYS
See also COPPER BASE ALLOYS
Amorphous State
Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g), 8: 44232 (BA:NL)
Diffusion
Interdiffusion in β phase Cu—Al alloys, 8: 44207 (J:US)
Physical Radiation Effects
Simulation irradiation of binary copper alloys, 8: 44168 (RA:DE:In German)
Sputtering
Sputtering yields for two-phase Ag-Cu thin film alloys, 8: 44846 (RA:SU)
Swelling
Simulation irradiation of binary copper alloys, 8: 44168 (RA:DE:In German)

COPPER BASE ALLOYS
See also BRONZE
Physical Radiation Effects
Effect of difference in impurity and matrix atom scattering cross-section on dislocation pinning under neutron irradiation, 8: 44166 (RA:SU:In Russian)
Mechanisms of amplitude- and time dependence of internal friction due to radiation defects, 8: 44167 (RA:SU:In Russian)

COPPER COMPLEXES
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)

CORES (REACTOR)
See REACTOR CORES

CORN (MAIZE)
See MAIZE

CORN STOVER
See AGRICULTURAL WASTES
MAIZE

CORONA COUNTERS
Performance Testing
Some characteristics of a multiwire corona counter, 8: 44574 (RA:CS:In Slovak)

CORROSION FATIGUE
Standards
Some thoughts on establishing design and inspection codes for corrosion fatigue, 8: 44187 (RA:US)

CORROSION INHIBITION
See CORROSION PROTECTION

CORROSION PROTECTION
Protective Coatings
Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings, 8: 44238 (TJ:US)
Research needs for the use of polymer coatings for corrosion protection, 8: 44136 (R:US)

COSMIC GAMMA BURSTS
Observations of fast, transient gamma-ray phenomena, 8: 44826 (R:DE)

COSMIC MUONS
Prior to July, 1975 information was indexed to MUONS.
Multiple Production
Multiple muons in the Homestake underground detector, 8: 44830 (J:US)

COSMOGONY
See COSMOLOGY

COSMOLOGICAL MODELS
Neutrinos
Massive, degenerate neutrinos and cosmology, 8: 44829 (J:US)
Reviews
Early universe and high-energy physics, 8: 44831 (J:US)

COSMOLOGY
Research Programs
Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983 (Brandeis University), 8: 44911 (R:US)

COSMOS
See UNIVERSE

COULOMB SCATTERING
Shadow Effect
Some analytical solutions to the two atom blocking model, 8: 44858 (RA:SU)

COUNTERFLOW COOLING TOWERS
See COOLING TOWERS

COUNTY BUILDINGS
See PUBLIC BUILDINGS

COUPLED CHANNEL THEORY
Semiclassical Approximation
Comparison of the semiclassical coupled channel theory of particle transfer with exact calculations, 8: 45037 (J:US)

COURT BUILDINGS
See PUBLIC BUILDINGS

COYOTES
Predator-Prey Interactions
Pronghorn responses to hunting coyotes, 8: 44715 (J:US)

CRACK GROWTH
See CRACK PROPAGATION
CRACK PROPAGATION
Fatigue crack growth from blunt notches, 8: 44442 (R:DE)
Subcritical fatigue crack growth under combined primary and secondary loads, 8: 44190 (RA:US)
Data Covariances
Role of uncertainty in the measurement of crack length by compliance techniques, 8: 44177 (RA:US)
Mathematical Models
Fatigue crack growth theory based upon energy consideration, 8: 44183 (RA:US)
Mechanism of environmentally-controlled crack-growth of structural steels in high-temperature water, 8: 44185 (RA:US)
Meetings
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions I and II. Vol. 1, 8: 43751 (R:US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8: 44178 (R:US)
Test Facilities
Device for investigating subcritical crack growth of RPV steel specimens under BWR conditions, 8: 43755 (RA:US)
CRITICAL ASSEMBLIES
See ZERO POWER REACTORS
CRITICAL MASS
Neutron Transport Theory
Calculation of critical parameters in uranium mixtures, 8: 43844 (RA:BR:In Portuguese)
CRITICALITY
Nuclear-fuel-cycle education: Module 6. Criticality safety, 8: 43401 (R:US)
CRITICALITY ACCIDENTS
See CRITICALITY
CROSSFLOW COOLING TOWERS
See COOLING TOWERS
CRUDE OIL
See PETROLEUM
CRYOGENIC BUBBLE CHAMBERS
Computer Codes
Software development minimum guidance system. Algorithm and specifications of realizing special hardware processor data prefilter program, 8: 44605 (R:SU:In Russian)
Light Pipes
Application of light pipes with large cross sections for transmission of service data image to the photographic film of a hydrogen chamber, 8: 44593 (R:SU:In Russian)
Neutrino Detection
Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber, 8: 44578 (R:SU:In Russian)
Nuclear Emulsions
Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber, 8: 44578 (R:SU:In Russian)
On-Line Measurement Systems
Software development minimum guidance system. Algorithm and specifications of realizing special hardware processor data prefilter program, 8: 44605 (R:SU:In Russian)
CRYOPUMPS
Cryopump operations with the tokamak neutral beam injector prototype, 8: 45274 (BA:US)
CRYSTAL LATTICES
Computerized Simulation
Monte Carlo simulation of shock-induced lattice damage, 8: 45066 (R:US)
Physical Radiation Effects
Effect of stationary force fields on the concentration and distribution of radiation damages in atom collision cascades, 8: 44272 (RA:SU:In Russian)
Shock Waves
Monte Carlo simulation of shock-induced lattice damage, 8: 45066 (R:US)
CRYSTALLOGRAPHY
Research Programs
Research on surface physics and crystallography at NSLS. Technical progress report, 1 November 1982-31 October 1983, 8: 45063 (R:US)
CURIUM COMPOUNDS
Raman Spectra
Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8: 44365 (J:NL)
CURRENT-DRIVE HEATING
Current-drive experiments on the PLT Tokamak, 8: 45148 (R:US)
ECH current drive on the ISX-B tokamak, 8: 45096 (RA:US)
CURTAINS
Thermal Insulation
Passive marketable products program automatic insulating roller curtain development, 8: 44066 (RA:US)
CUTTING
Mathematical Models
Modeling and analysis of drag-bit cutting, 8: 43665 (R:US)
CYCLOALKENES
Chemisorption
Silane surface chemistry of palladium: synthesis of silaethylene, silacyclobutadiene, and silabenzene, 8: 44339 (J:US)
Oxidation
Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983 (Cyclohexene), 8: 44356 (R:US)
CYCLONE COMBUSTORS
Operation
Ablative entrained flow fast pyrolysis status, 8: 43433 (RA:US)
CYLINDERS
Objects of cylindrical shape. For containers see headings such as GAS CYLINDERS.
Natural Convection
Free convection between horizontal cylinders in water at low temperature, 8: 44423 (R:BR)
CYLINDRICAL PARABOLIC COLLECTORS
See PARABOLIC TROUGH COLLECTORS

D

DARRIEUS ROTORS
Performance Testing
Development and testing of a 20 kW vertical rotor (Phase 1), 8: 43705 (RA:DE:In German)
Research Programs
Vertical axis wind turbine research and development, 8: 43709 (RA:US)
Specifications
Development and testing of a 20 kW vertical rotor (Phase 1), 8: 43705 (RA:DE:In German)
DATA ACQUISITION SYSTEMS
Use of ORACLE in a scientific environment, 8: 45265 (R:US)
CAMAC System
CAMDAS (CAMAC data-acquisition system), 8: 45315 (R:US)
Computer Codes
Comparative characteristics of programs for statistical distribu-- tion collection in the HBOOK system, 8: 45296 (R:SU:In Russian)
Computer Networks
Software for the SONET computer network intended for automation of scientific experiments, 8: 43891 (R:SU:In Russian)
Design
Organization of M-6000 computer operation on-line with experimental apparatus, 8: 44585 (R:SU:In Russian)
Manuals
CAMDAS (CAMAC data-acquisition system), 8: 45315 (R:US)
Real Time Systems
Unified system for information exchange between the ES-1040 computer and physical equipment via the MKK 880M controller, 8: 44638 (R:SU:In Russian)

Remote Control
Device for information input into a computer, 8: 45291 (R:SU:In Russian)
DATA BASE MANAGEMENT
Programming Languages
Data models and data manipulation languages: complementary semantics and proof theory, 8: 45320 (BA:US)
DATA PROCESSING
Manipulation of unit facts.
See also SPECTRA UNFOLDING
Computer Codes
Metacad programmer's guide, 8: 45310 (R:US)
Manuals
Procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of the CPT-8000/8100 word processor, 8: 45318 (R:US)
DATA TRANSMISSION
On-Line Systems
Basis software for microprogrammed channel controller for operation on-line with experimental physical installations, 8: 44637 (R:SU:In Russian)
DAUGHTER PRODUCTS
Radioecological Concentration
Radon dosimetry: a review of radon and radon daughter exposure conditions in dwellings and other structures, 8: 44706 (R:US)
DAYLIGHTING
Commercialization
Overview of the National Passive Solar Products Program, 8: 43621 (RA:US)
Demonstration Programs
Mennonite Nursing Home passive solar demonstration project, 8: 43602 (RA:US)
Education
Passive building climatology curriculum development, 8: 43620 (RA:US)
Research Programs
Overview of the National Passive Solar Products Program, 8: 43621 (RA:US)
Retrofitting
DOE Passive Commercial Demonstration Program update report, 8: 43604 (RA:US)
DEC COMPUTERS
Computers manufactured by Digital Equipment Corporation.
Data Processing
Procedure for communications with PDP-10 and PDP-11 (IS/1 UNIX) type computers through use of the CPT-8000/8100 word processor, 8: 45318 (R:US)
DECAY PRODUCTS
See DAUGHTER PRODUCTS
DECHANNELING
See CHANNELING
DECIDUOUS TREES
See TREES
DECOMMISSIONING
Environmental Impact Statements
Final Environmental Statement related to the decommissioning of the Rare Earths Facility, West Chicago, Illinois. Docket No. 40-2061, 8: 44756 (R:US)
DECONTAMINATION
New decontamination techniques for exposure reduction (Electropolishing, vibratory finishing, and liquid honing), 8: 43376 (R:US)
DECONTAMINATION FACTOR
See DECONTAMINATION
DEGASSING
Demonstration Programs
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)
Emission
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)
Quantity Ratio
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)
DENITRIFICATION
Cost
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
Process Development Units
Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8: 43214 (R:US)
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
DENMARK
Brown Coal
Brown-coal reserves of Denmark. Report of phase 1, 8: 43245 (R:DK:In Danish)
DENSITY (PLASMA)
See PLASMA DENSITY
DEOXYPENTOSE NUCLEIC ACID
See DNA
DEOXYRIBONUCLEIC ACID
See DNA
DESOXYRIBONUCLEIC ACID
See DNA
DESULFURIZATION
Cost
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
Process Development Units
Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8: 43214 (R:US)
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
DEUTERIUM
Chemical Reactions
Gaseous ion reactions in SiF_4 and SiF_4—D_2 mixtures, 8: 44337 (J:US)
Isotope Effects
Isotope dependence of the breakdown strength of gases, 8: 44294 (J:US)
DEUTERIUM IONS
Ion Sources
High-concentration H_3^+ or D_3^+ ion source, 8: 44889 (J:US)
DEUTERIUM OXIDES
See HEAVY WATER
DEUTERIUM TARGET
Hadron Reactions
Conventional approach to the problem of the deuteron smearing corrections, 8: 44970 (J:US)
Helium 3 Reactions
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
Lepton Reactions
Conventional approach to the problem of the deuteron smearing corrections, 8: 44970 (J:US)
DEUTERON REACTIONS
Capture
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8: 44977 (R:US)
Pickup Reactions
Study of the sup(39,41)K(d,³He)sup(38,40)Ar reactions at 22.8 MeV, 8: 44999 (J:NL)
Stripping
Microscopic formalism for intermediate energy transfer reactions: Application to the (p,d) and (d,p) reactions, 8: 44979 (J:US)
DEUTERON-DEUTERON INTERACTIONS
See DEUTERIUM TARGET
DEUTERON REACTIONS
DEUTERONS
Photonuclear Reactions
Electric polarizability of the deuteron, 8: 44972 (J:US)

Polarizability
Electric polarizability of the deuteron, 8: 44972 (J:US)
Wave Functions
Conventional approach to the problem of the deuteron smearing corrections, 8: 44970 (J:US)
DEVELOPING COUNTRIES
See also BRAZIL
INDIA
IRAN
IRAQ
OMAN
TURKEY
VENEZUELA
Petroleum Industry
Third World petroleum development: a statement of principles, 8: 44039 (R:US)
Rural Areas
Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves, 8: 44014 (J:GB)
DEVICES
See EQUIPMENT
DEVONIAN SHALES
See BLACK SHALES
DEWARS
Design
Vessel for cryogenic liquid with a flexible vacuum shell, 8: 44387 (R:SU:In Russian)
DIAMOND DRILLING EQUIPMENT
See DRILLING EQUIPMENT
DIAMONDS
Cutting
Goniometer attachment for low-speed diamond wafering saws, 8: 44395 (J:US)
DIAPHRAGMS (THERMONUCLEAR DEVICE)
See LIMITERS
1,4-DIAZINES
See PYRAZINES
DIELECTRIC MATERIALS
Damage
Dielectric relaxation in insulators slightly damaged by stress pulses, 8: 44295 (J:US)
Dielectric Properties
Dielectric relaxation in insulators slightly damaged by stress pulses, 8: 44295 (J:US)
Electrical Properties
Electrical response of relaxing dielectrics compressed by arbitrary stress pulses, 8: 45072 (J:US)
Ion Implantation
Kinetics of charged particle implantation in dielectrics taking into account the effect of space charge build-up, 8: 45043 (RA:SU:In Russian)
Response Functions
Electrical response of relaxing dielectrics compressed by arbitrary stress pulses, 8: 45072 (J:US)
DIELECTRICS
See DIELECTRIC MATERIALS
DIESEL ENGINES
Air Pollution
Influence of air flow inside the combustion space on the exhaust emissions of a direct-injection diesel engine, 8: 44122 (R:DE:In German)
Design
No-coolant diesel engine, 8: 44121 (R:XE)
Fabrication
No-coolant diesel engine, 8: 44121 (R:XE)
Inspection
Application of an automatic pattern recognition for aleatory signals for the surveillance of nuclear reactor and rotating machinery, 8: 43749 (R:BR:In Portuguese)
Materials Testing
No-coolant diesel engine, 8: 44121 (R:XE)
DIESEL FUELS
Combustion Products
Chemical and mutagenic characteristics of diesel-exhaust particles from different diesel fuels, 8: 44687 (R:US)
Specifications
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
DIESEL OIL (FRACTION)
See DIESEL FUELS
DIFFERENTIAL EQUATIONS
See also NEUTRON DIFFUSION EQUATION
Analytical Solution
Measuring stiffness, 8: 45311 (R:US)
DIFFRACTION (X-RAY)
See X-RAY DIFFRACTION
DIFFUSION
Computer Calculations
DIFFUSE 83 (Diffusion and trapping of atoms in material), 8: 45312 (R:US)
DIMETHYL KETONE
See ACETONE
DIODE TRANSISTORS
See TRANSISTORS
DIRAC MONOPOLES
See MAGNETIC MONOPOLES
DIRECT GAIN SYSTEMS
Prior to September 1980 HEAT GAIN was used to index this concept.
Design
Design and performance of a cycle five house: a review, 8: 43578 (RA:US)
Development of the independence series bringing passive solar to the real world, 8: 43559 (RA:US)
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
Simulation and design of solar energy systems, 8: 43575 (RA:US)
Performance
Analysis of performance of passive solar heated nature center, 8: 43583 (RA:US)
Design and performance of a cycle five house: a review, 8: 43578 (RA:US)
Libertytown solar demonstration home, 8: 43576 (RA:US)
Simulation and design of solar energy systems, 8: 43575 (RA:US)
Performance Testing
Suncatcher monitoring project, 8: 43582 (RA:US)
Shutters
Reflective insulating blinds for window applications, 8: 43630 (RA:US)
Solar Reflectors
Suncatcher monitoring project, 8: 43582 (RA:US)
Thermal Analysis
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
DISCHARGES (WASTES)
See WASTE DISPOSAL
DISINTEGRATION (FISSION)
See FISSION
DISLOCATIONS
Channeling
Dechanneling by extended defects, 8: 44148 (RA:SU)
Positrons
Positron annihilation as a technique for dislocation line studies, 8: 44235 (BA:US)
DISPERSED STORAGE AND GENERATION
Safety
Electric utility intertie issues for small, dispersed power sources, 8: 44041 (RA:US)
DISPOSAL (WASTES)
See WASTE DISPOSAL
DISSOLVED OXYGEN
See OXYGEN
DISTILLATION EQUIPMENT
See also RETORTS
Building Materials
Use of plastic construction materials in small-scale fuel alcohol production, 8: 43524 (J:US)
DISTRIBUTED COLLECTOR POWER PLANTS
Design
100 kW Solar Thermal Electric Experimental Plant, 8: 43534 (R:FR)

Energy Cascade
Shenandoah Solar Total Energy Project, 8: 43538 (RA:US)
Energy Yield
Solar thermal power plant 30/50 kWsub(e), 8: 43533 (R:DE:In German)
Operation
Solar thermal power plant 30/50 kWsub(e), 8: 43533 (R:DE:In German)
Performance Testing
Solar thermal power plant 30/50 kWsub(e), 8: 43533 (R:DE:In German)

DNA
Biological Radiation Effects
Repair and cell cycle response in cells exposed to environmental biohazards. Progress report, 1 June 1982-31 May 1983, 8: 44788 (R:US)
Biological Repair
Impact of cofactors and inhibitors on DNA repair synthesis after γ-irradiation in semi-permeable Escherichia coli cells, 8: 44795 (R:DE:In German)

DOCUMENT RETRIEVAL
See INFORMATION RETRIEVAL

DOLOMITE
Calcination
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8: 43163 (R:US)
Sulfidation
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8: 43163 (R:US)

DOMED STRUCTURES
Solar Space Heating
Weather Bubble, 8: 43634 (RA:US)

DOMES (STRUCTURES)
See DOMED STRUCTURES

DORMITORIES
See RESIDENTIAL BUILDINGS

DOUBLET 3 DEVICES
See DOUBLET REACTORS

DOUBLET REACTORS
ECR Heating
60 GHz ECH on Doublet III: 40 kW phase, 8: 45203 (RA:US)

DOXORUBICIN
Biochemical Reaction Kinetics
Impact of cofactors and inhibitors on DNA repair synthesis after γ-irradiation in semi-permeable Escherichia coli cells, 8: 44795 (R:DE:In German)

DRAPERIES
See CURTAINS

DRESDEN-1 REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)

DRESDEN-2 REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)

DRIFT CHAMBERS
Design
Low pressure drift chamber in experiment on studies of radiation of relativistic particles in single crystals, 8: 44607 (R:SU:In Russian)
Proton Channeling
Low pressure drift chamber in experiment on studies of radiation of relativistic particles in single crystals, 8: 44607 (R:SU:In Russian)

DRIFT (ELECTRON)
See ELECTRON DRIFT

DRIFT INSTABILITY
Kinetic theory of the anomalous transport, 8: 45142 (RA:JP)
Theory of drift instabilities and the associated anomalous transport, 8: 45143 (R:JP)
Analytical Solution
Nonlinear theory of drift instability, 8: 45139 (RA:JP)
Charged-Particle Transport Theory
Phenomenological theory of the anomalous transport in tokamaks, 8: 45141 (RA:JP)
Computer Codes
TEDIT, a computer code for studying the time evolution of drift instabilities in a torus, 8: 45146 (R:US)
Dispersion Relations
Linear theory of drift instability, 8: 45140 (RA:JP)

DRIFT (PLASMA)
See PLASMA DRIFT

DRILL BITS
Performance Testing
Experimental studies on drilling with roller bits in a deep-drilling test bench at a rotational speed of 50 min^{-1} to 150 min^{-1}, 8: 44391 (R:DE:In German)

DRILL PIPES
Accidents
Well control in case of offshore blowout. Mechanized drill pipe handling, stabbing, stripping/snubbing, drill string telemetry and mud monitoring, better BOP, 8: 43280 (R:NO)

DRILL SHIPS
See OFFSHORE PLATFORMS

DRILLING EQUIPMENT
See also DRILL BITS
DRILL PIPES
Automation
Development of an adaptive control of deep-hole-drilling, 8: 44390 (R:DE:In German)
Control Systems
Development of an adaptive control of deep-hole-drilling, 8: 44390 (R:DE:In German)

DRILLING PLATFORMS
See OFFSHORE PLATFORMS

DROPLETS
Physical Radiation Effects
Instrument to detect vapor-nucleation in superheated liquid (Use for neutron detection), 8: 44567 (R:US)
Investigations on the applicability of superheated drop detectors in neutron dosimetry, 8: 44568 (R:US)

DRY SCRUBBERS
Feasibility Studies
Flue gas desulphurization in a spray tower with de-coupled recycling of soda ash, 8: 43735 (R:DE:In German)

DRYERS
Energy Consumption
Industrial fuel applications. Furnaces and dryers, 8: 44099 (R:NL:In Dutch)
IV 5: all-electric drying of textile cloths, 8: 44106 (TG:GB)

DRY-TYPE COOLING TOWERS
See COOLING TOWERS

DTO
See HEAVY WATER

DUBAI
See UNITED ARAB EMIRATES

DUBNA PULSED REACTOR
See IBR-2 REACTOR

DUBNA SYNCHROCYCLOTRON
Beam Extraction
Transport channel for extracted proton beam of JINR phasotron, 8: 44538 (R:SU:In Russian)
Beam Transport
Transport channel for extracted proton beam of JINR phasotron, 8: 44538 (R:SU:In Russian)

DUCTS
Convection
Slow forced and free convection in inclined channels, 8: 44415 (R:BR)
Fluid Flow
Resistance characteristics of rough open channels with a rigid boundary, 8: 44433 (R:DE)

DUSTS
Body Burden
Portable fluxgate magnetometer for non-invasive measurement of occupationally acquired lung dust. Progress report, September 15, 1982-September 14, 1983, 8: 44766 (R:US)
Chemical Analysis
Kiln dust-fly ash systems for highway bases and subbases, 8: 44100 (R:US)

Emission
Dust emission, its quantity and composition, depending on dust collector; coal quality etc., 8: 43207 (RA:DK)

DYMAC SYSTEM
See NUCLEAR MATERIALS MANAGEMENT PLUTONIUM

DYNAMIC LOADS
Measuring Methods
Measurement of in situ dynamic properties in relation to geologic conditions, 8: 43882 (J:US)

DYNAMIC MASS SPECTROMETERS
Ion Sources
Laser ion source for a mass spectrometer, 8: 44602 (R:SU:In Russian)

DYNAMIC MATERIALS ACCOUNTABILITY SYSTEM
See NUCLEAR MATERIALS MANAGEMENT PLUTONIUM

DYNAMICS
Space Dependence
Coherent spatial structure versus time chaos in a perturbed sine-Gordon system, 8: 45086 (J:US)

DYNAMICS (BEAM)
See BEAM DYNAMICS

DYSPROSIUM 162
Neutron Reactions
Average resonance capture studies of /sup 162,164/Dy, 8: 45011 (J:US)

DYSPROSIUM 164
Neutron Reactions
Average resonance capture studies of /sup 162,164/Dy, 8: 45011 (J:US)

DYSPROSIUM 165
Energy Levels
Identification of a new isotope ^{165}Tb, 8: 45014 (J:US)

E

EARTH ATMOSPHERE
See also MAGNETOSPHERE
Chemical Composition
Theoretical analysis of the past variations in global atmospheric composition and temperature structure, 8: 44692 (R:US)
Mathematical Models
Atmospheric modeling and environmental protection needs, 8: 44655 (RA:US)
Land use and transportation impact on air quality, 8: 43996 (RA:US)

EARTH CRUST
Deformation
Viscoelastic-gravitational deformation by a rectangular thrust fault in a layered earth, 8: 44821 (J:US)

EASTERN EUROPE
Technology Transfer
Technology transfer to the East: an annotated bibliography for 1976 to 1981, 8: 43981 (R:US)

ECN
Energieonderzoek Centrum Nederland; prior to 1 August 1976 known as Reactor Centrum Nederland, and documents written before that date should be indexed to RCN.
Coordinated Research Programs
Annual report 1981, 8: 44012 (R:NL:In Dutch)

ECOLOGICAL COMMUNITIES
See ECOSYSTEMS

ECONOMIC DEVELOPMENT
Environmental Policy
Research problems and issues in the application of land use controls to environmental protection, 8: 43997 (RA:US)

ECONOMIC POLICY
Optimization
Optimal stabilization policy in a model of elasticity dynamics, 8: 43987 (R:US)

ECOSYSTEMS
See also AQUATIC ECOSYSTEMS
Maps
Carbon in live vegetation of major world ecosystems, 8: 44710 (R:US)

ECR HEATING
ECH current drive on the ISX-B tokamak, 8: 45096 (RA:US)
PDX ECRH, 8: 45097 (RA:US)
Electron Density
High-frequency plasma heating in tokamak FT-1 at overcritical density. II., 8: 45116 (RA:CS:In Russian)
Plasma Density
High-frequency plasma heating in tokamak FT-1 at overcritical density. I., 8: 45115 (RA:CS:In Russian)

EDDY CURRENT TESTING
Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982 (PWR), 8: 43785 (R:US)
Immersed multipurpose device for the inspection of PWR spent pencils in a loop reloaded in the Osiris pool, 8: 43883 (R:FR:In French)
In-service inspection of reactors, 8: 43763 (R:FR:In French)
Computer Codes
Developments in eddy-current computation with eddynet, 8: 44440 (R:US)
Data Analysis
Developments in eddy-current computation with eddynet, 8: 44440 (R:US)

EDDY CURRENTS
Limited to electric currents.
Computer Codes
Survey of eddy-current programs, 8: 44441 (R:US)

EDF-5 REACTOR
See BUGEY-1 REACTOR

EDUCATION
Informational technology and its impact on American education, 8: 44119 (R:US)

EDUCATIONAL FACILITIES
See also SCHOOL BUILDINGS
Daylighting
College Center, 8: 43597 (RA:US)
Super-insulated energy education center in Syracuse, New York, 8: 44064 (RA:US)
Passive Solar Heating Systems
College Center, 8: 43597 (RA:US)
Thermal Insulation
Super-insulated energy education center in Syracuse, New York, 8: 44064 (RA:US)

EFFECTIVE ENERGY (INTERNAL IRRADIATION)
See INTERNAL IRRADIATION

EFFLUENTS (CHEMICAL)
See CHEMICAL EFFLUENTS

EFFLUENTS (GASEOUS)
See GASEOUS WASTES

EFFLUENTS (LIQUID)
See LIQUID WASTES

EFFLUENTS (THERMAL)
See THERMAL EFFLUENTS

EFFUSION
See DIFFUSION

EGGS
Size
Parental investment in the chicken turtle (Deirochelys reticularia), 8: 44785 (J:US)

EINSTEIN-DE SITTER MODEL
See COSMOLOGICAL MODELS

EINSTEINIUM COMPOUNDS
Raman Spectra
Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8: 44365 (J:NL)

ELASTIC SCATTERING
See also COULOMB SCATTERING
Argand Diagrams
Scattering with absorptive interaction: Energy-dependent potentials, 8: 45030 (J:US)
Energy Dependence
Scattering with absorptive interaction: Energy-dependent potentials, 8: 45030 (J:US)

ELASTOMERS
Fabrication
New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report, 8: 43664 (R:US)
Testing
New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report, 8: 43664 (R:US)
ELECTRIC ARCS
Craters
Crater formation by high current discharges in vacuum, 8: 45246 (RA:CS)
ELECTRIC CABLES
See also SUPERCONDUCTING CABLES
Electrical Properties
Determination of threshold and maximum operating electric stresses for selected high voltage insulations. Task II. Investigation of oil-filled paper insulated cables. Progress report No. 3. CTL-83-016, 8: 44451 (R:US)
ELECTRIC CONDUCTIVITY
See also SUPERCONDUCTIVITY
Measuring Instruments
Alternative methods for determining the electrical conductivity of core samples. II, 8: 44456 (J:US)
ELECTRIC CONTACTORS
See SWITCHES
ELECTRIC GENERATORS
Rotating generators only; excludes DIRECT ENERGY CONVERTERS.
Cost
Calculation method of the power generation costs of a nuclear power plant, 8: 44019 (R:NL:In Dutch)
ELECTRIC MOTORS
Control Equipment
Commercialization of the power-factor controller. Final report, 8: 44076 (R:US)
Power Factor
Commercialization of the power-factor controller. Final report, 8: 44076 (R:US)
ELECTRIC POWER
Economics
Industrial electrification trend shows strength, 8: 44045 (J:US)
Feasibility Studies
Industrial electrification trend shows strength, 8: 44045 (J:US)
ELECTRIC RESISTIVITY
See ELECTRIC CONDUCTIVITY
ELECTRIC SWITCHES
See SWITCHES
ELECTRIC UTILITIES
Accounting
Nordwestdeutsche Kraftwerke A.G.: 80. business report, 8: 44111 (R:DE:In German)
Nordwestdeutsche Kraftwerke A.G.: 81. business report, 8: 44112 (R:DE:In German)
Control Systems
Hierarchial power control center analyzer. Volume 4. Appendixes and bibliography. Final report, 8: 44042 (R:US)
Economic Analysis
Energy-price dynamics and US depressions: recent analogies, 8: 43986 (R:US)
Energy Demand
Industrial power: electrical rates, reliability, and energy management, 8: 43734 (B:US)
Energy Models
Summary of the workshop on regulatory-financial models of the US electric utility industry, 8: 44044 (R:US)
Meetings
Summary of the workshop on regulatory-financial models of the US electric utility industry, 8: 44044 (R:US)
Planning
Alternative energy futures: a review of low-energy-growth forecasts and least-cost planning studies, 8: 44028 (R:US)
Rate Structure
Industrial power: electrical rates, reliability, and energy management, 8: 43734 (B:US)
Research Programs
Photovoltaic status assessment: utility perspective , 8: 43499 (RA:US)
ELECTRICAL CONDUCTIVITY
See ELECTRIC CONDUCTIVITY
ELECTRICAL EQUIPMENT
See also ANTENNAS
ELECTRICAL INSULATORS
SWITCHES
Control Systems
Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8: 43247 (R:DE:In German)
Failure Mode Analysis
Potentially damaging failure modes of high- and medium-voltage electrical equipment, 8: 44452 (R:US)
Monitoring
Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8: 43247 (R:DE:In German)
ELECTRICAL INSULATORS
Electric Conductivity
Effective conductivity by fluid analogy for a porous insulator filled with a conductor, 8: 45070 (J:US)
ELECTRICAL RESISTANCE
See ELECTRIC CONDUCTIVITY
ELECTRICAL RESISTIVITY
See ELECTRIC CONDUCTIVITY
ELECTRIC-POWERED VEHICLES
Computerized Simulation
Comparison of road-load-simulator test results with track tests on electric-vehicle propulsion system, 8: 44126 (R:US)
Design
Near-term electric test vehicle. Phase II. Final report, 8: 44124 (R:US)
Engineering Drawings
Near-term electric test vehicle. Phase II. Final report, 8: 44125 (R:US)
Fuel Cells
Electrochemical and surface science research on fuel cells, 8: 44054 (RA:US)
Performance Testing
Comparison of road-load-simulator test results with track tests on electric-vehicle propulsion system, 8: 44126 (R:US)
Near-term electric test vehicle. Phase II. Final report, 8: 44124 (R:US)
Road Tests
Comparison of road-load-simulator test results with track tests on electric-vehicle propulsion system, 8: 44126 (R:US)
Systems Analysis
Near-term electric test vehicle. Phase II. Final report, 8: 44124 (R:US)
ELECTROCHEMICAL CELLS
See also FUEL CELLS
PHOTOELECTROCHEMICAL CELLS
Electrodes
Method of making electrodes for electrochemical cell, 8: 43979 (P:US)
ELECTRODES
See also CATHODES
Electric Conductivity
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8: 43189 (R:DE:In German)
Fabrication
Method of making electrodes for electrochemical cell, 8: 43979 (P:US)
Graphitization
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8: 43189 (R:DE:In German)
Manufacturing
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8: 43189 (R:DE:In German)

ELECTROLYTES
Fluid Flow
Low hydrostatic head electrolyte addition to fuel cell stacks, 8: 44058 (P:US)
ELECTROMAGNETIC FIELDS
Interactions
Chaos in the semiclassical N-atom Jaynes-Cummings model: Failure of the rotating-wave approximation, 8: 44407 (J:US)
ELECTRON BEAM INJECTION
Inertial Confinement
Ion-beam-driven inertial confinement fusion. An overview, 8: 45238 (RA:JP)
ELECTRON BEAM TARGETS
Implosions
Two-frame flash x-radiography device for the study of particle beam fusion target implosions, 8: 45272 (J:US)
X-Ray Spectra
Two-frame flash x-radiography device for the study of particle beam fusion target implosions, 8: 45272 (J:US)
ELECTRON BEAMS
Acceleration
Numerical simulation of the motion of a dense electron bunch interacting with a pulsed accelerating field in an inhomogeneous cavity, 8: 44500 (R:SU:In Russian)
Beam Monitors
Induction pick-up of placement of electron beam centre of gravity, 8: 44541 (R:SU:In Russian)
Beam Position
Induction pick-up of placement of electron beam centre of gravity, 8: 44541 (R:SU:In Russian)
Instability
Shear-driven instabilities of annular relativistic electron beams in vacuum, 8: 44888 (J:US)
Oscillations
Computer simulations of reflex E-beam systems and plasma, 8: 45124 (RA:CS)
Relativistic Beam Injection
Simulation of ionization front forming at injection of relativistic electron beam in a gas chamber, 8: 44549 (R:SU:In Russian)
Uses
Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8: 43214 (R:US)
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
ELECTRON CHANNELING
Dechanneling function for relativistic axially channeled electrons, 8: 45044 (RA:SU:In Russian)
Photon Emission
Classical theory of relativistic charged particle radiation in crystals, 8: 45047 (RA:SU:In Russian)
ELECTRON CYCLOTRON MASERS
See MICROWAVE AMPLIFIERS
ELECTRON CYCLOTRON-RESONANCE HEATING
See ECR HEATING
ELECTRON DRIFT
Stability
Stability of relativistic laminar flow equilibria for electrons drifting in crossed fields, 8: 45271 (J:US)
ELECTRON GUNS
Tag gun conceptualization, 8: 45206 (RA:US)
ELECTRON PLASMA WAVES
Hybrid Resonance
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation, 8: 45118 (RA:CS)
ELECTRON RINGS
Instability
Computer simulation of radiation instability in relativistic electron rings, 8: 44499 (R:SU:In Russian)
ELECTRONIC DATA PROCESSING
See DATA PROCESSING
ELECTRON-ION COLLISIONS
Excitation
Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory, 8: 44890 (J:US)
Inelastic Scattering
Quantum-defect and distorted-wave theory applied to the resonance contribution of inelastic electron scattering, 8: 44898 (J:US)
Ionization
Electron impact ionization of highly charged molybdenum impurities in tokamak plasmas, 8: 45119 (RA:CS)
Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory, 8: 44890 (J:US)
Measurement of the cross section for electron-impact ionization of Xe^{q+} ions, 8: 44891 (J:US)
ELECTRON-POSITRON INTERACTIONS
Annihilation
Differential 3-Jet cross section in e^+e^--annihilation and comparison with 2sup(nd)-order predictions of QCD and Abelian vector theory, 8: 44916 (R:DE)
Experimental evidence for differences in <pperpendicular to> between quark jets and gluon jets, 8: 44917 (R:DE)
Investigation of two photon final states in e^+e^- annihilation at $<\sqrt{5}> = 34.2$ GeV, 8: 44919 (R:DE)
Measurement of charge properties of quark jets at PETRA, 8: 44915 (R:DE)
Neutral-current effects in quantum-chromodynamic four-jet production, 8: 44940 (J:US)
Search for new heavy leptons at PETRA, 8: 44918 (R:DE)
Jet Model
Experimental evidence for differences in <pperpendicular to> between quark jets and gluon jets, 8: 44917 (R:DE)
Multiple Production
Variation of the strong coupling constant from a measurement of the jet energy spread in e^+e^- annihilation, 8: 44928 (J:NL)
Particle Production
Multiparticle hadronic systems produced in high-energy (pp) interactions, and comparison with (e^+e^-), 8: 44913 (R:CH)
ELECTRON-RING ACCELERATORS
Beam Dynamics
Computer simulation of radiation instability in relativistic electron rings, 8: 44499 (R:SU:In Russian)
Space Charge
Effect of nonlinear ion space charge forces on the ion beam parameters of a collective accelerator, 8: 44498 (R:SU:In Russian)
ELECTROSTATIC PRECIPITATORS
Efficiency
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Mathematical Models
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Performance
Bipolar current probe and its application in electrostatic precipitators for diagnosis of back discharge severity, 8: 44463 (RA:DE)
ELECTROSTATIC WAVES
See PLASMA WAVES
ELEMENTS
For chemical elements only.
See also METALS
Absorption Spectroscopy
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2 (74 inorganic trace elements and 21 polycyclic aromatic hydrocarbons), 8: 43224 (R:US)
Mass Spectroscopy
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2 (74 inorganic trace elements and 21 polycyclic aromatic hydrocarbons), 8: 43224 (R:US)

ELMO BUMPY TORUS
Electron Drift
Nonresonant electron transport in the ELMO Bumpy Torus experiment using a BGK operator, 8: 45180 (J:US)
Ion Drift
Resonant ion transport in the ELMO Bumpy Torus, 8: 45176 (J:US)
Magnetic Field Configurations
Reduction of radial losses in bumpy tori, 8: 45162 (J:US)
Microwave Amplifiers
ORNL 28-GHz user experience, 8: 45201 (RA:US)
Transport Theory
Resonant ion transport in the ELMO Bumpy Torus, 8: 45176 (J:US)
EMERGENCY PLANS
Pajarito Plan for Radiation Emergency. Standard operating procedures, 8: 43894 (R:US)
Evacuation
Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation, 8: 43948 (R:US)
EMPLOYEES
See PERSONNEL
END USE SECTOR
See COMMERCIAL SECTOR
INDUSTRY
RESIDENTIAL SECTOR
TRANSPORTATION SECTOR
ENDF
See NUCLEAR DATA COLLECTIONS
ENDOMETRIUM
See UTERUS
ENERGY AUDITS
Educational Tools
Residential energy survey film. Final report, 8: 44114 (R:US)
Video Tapes
Residential energy survey film. Final report, 8: 44114 (R:US)
ENERGY CONSERVATION
Energy: everybody's business, 8: 44031 (RA:US)
Attitudes
Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8: 44117 (R:NL:In Dutch)
Decision Making
Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts, 8: 44026 (R:US)
Demonstration Programs
End-use research status report, April 1, 1983-June 30, 1983, 8: 43644 (R:US)
Environmental Impacts
Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts, 8: 44026 (R:US)
Financing
Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience, 8: 44074 (R:US)
Planning
Philadelphia Solar Planning Project, 8: 43489 (RA:US)
Public Opinion
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households, 8: 44115 (R:NL:In Dutch)
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households. Summary, 8: 44116 (R:NL:In Dutch)
Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8: 44117 (R:NL:In Dutch)
Recommendations
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors (FRG), 8: 44025 (R:DE:In German)
Socio-Economic Factors
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households, 8: 44115 (R:NL:In Dutch)
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households. Summary, 8: 44116 (R:NL:In Dutch)
Sociology
The social network approach to increase energy conservation: theoretical backgrounds, 8: 44118 (R:NL:In Dutch)
Technology Assessment
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors (FRG), 8: 44025 (R:DE:In German)
ENERGY CONSUMPTION
Attitudes
Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8: 44117 (R:NL:In Dutch)
Economic Impact
Energy-price dynamics and US depressions: recent analogies, 8: 43986 (R:US)
Public Opinion
Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8: 44117 (R:NL:In Dutch)
ENERGY CONVERSION
See also SOLAR ENERGY CONVERSION
Research Programs
Program summaries for 1982 - Energy Sciences programs, 8: 45284 (R:US)
ENERGY DEMAND
Forecasting
Alternative energy futures: a review of low-energy-growth forecasts and least-cost planning studies, 8: 44028 (R:US)
Mathematical Models
Some comments on the WEC energy demand model, 8: 43985 (R:SE)
ENERGY EFFICIENCY STANDARDS
Building Codes
Building energy performance standards. Phase IV. Code parameter list and code format listing, 8: 44070 (R:US)
Development of a building energy-code input form, 8: 44072 (R:US)
Evaluation of building-code descriptors, 8: 44071 (R:US)
ENERGY EXPENSES
Economic Impact
Energy prices and employment, 8: 43988 (R:NL:In Dutch)
Energy-price dynamics and US depressions: recent analogies, 8: 43986 (R:US)
ENERGY MANAGEMENT
Educational Tools
Homemaker energy management. Final report, 8: 44113 (R:US)
Manuals
Manager's guide to successful energy conservation, 8: 44060 (R:US)
Video Tapes
Homemaker energy management. Final report, 8: 44113 (R:US)
ENERGY MODELS
Manuals
Oil market Simulation model documentation report (OMS model), 8: 44038 (R:US)
S Codes
Determination of environment parameters for SELPE, a model for energy supply, 8: 43984 (R:NL:In Dutch)
ENERGY PERFORMANCE STANDARDS
See ENERGY EFFICIENCY STANDARDS
ENERGY POLICY
Economic Impact
Small business energy regulation project. Final report, 8: 44032 (R:US)
Recommendations
Energy: everybody's business (USA), 8: 44031 (RA:US)
ENERGY RECOVERY
Research Programs
Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary, 8: 43541 (R:US)

ENERGY SECURITY CORPORATION
See SYNTHETIC FUELS CORPORATION

ENERGY SOURCE DEVELOPMENT
Economic Impact
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I, 8: 44109 (R:US)
Environmental Impacts
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts, 8: 43286 (R:US)
Institutional Factors
Third World petroleum development: a statement of principles, 8: 44039 (R:US)
Political Aspects
Third World petroleum development: a statement of principles, 8: 44039 (R:US)
Socio-Economic Factors
Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops, 8: 43514 (BA:US)
Third World petroleum development: a statement of principles, 8: 44039 (R:US)
Technology Assessment
Evaluating new US energy technologies, 8: 44015 (J:US)

ENERGY SOURCES
See also NUCLEAR FUELS
RENEWABLE ENERGY SOURCES
WOOD FUELS
Benin
Benin - energy situation 1981, 8: 43982 (R:DE:In German)

ENERGY STORAGE
See also FLYWHEEL ENERGY STORAGE
HEAT STORAGE
Reviews
Review of energy storage, 8: 43968 (R:NL:In Dutch)

ENERGY STORAGE SYSTEMS
Energy Losses
Energy losses when three-step current switching from an inductive storage into a coil with a liner, 8: 45221 (R:SU:In Russian)
Induction
Shock-excited homopolar generator as inductive energy storage, 8: 45230 (RA:SU:In Russian)
Transients in shock-excited homopolar generator with exciting winding as an inductive storage, 8: 45229 (RA:SU:In Russian)
Redox Fuel Cells
Electrochemical rebalance cell for Redox systems, 8: 44057 (R:US)
Rotating Generators
Shock-excited homopolar generator as inductive energy storage, 8: 45230 (RA:SU:In Russian)
Transients in shock-excited homopolar generator with exciting winding as an inductive storage, 8: 45229 (RA:SU:In Russian)

ENERGY SUPPLIES
Temperatures of industrial process heat, 8: 44098 (R:NL:In Dutch)
Economic Analysis
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I, 8: 44109 (R:US)

ENERGY SYSTEMS
Use only in generic sense; e.g., comparisons of several energy systems or theoretical studies when system is not denoted specifically.
See also COOLING SYSTEMS
ENERGY STORAGE SYSTEMS
HEATING SYSTEMS
HOT-DRY-ROCK SYSTEMS
NATURAL GAS DISTRIBUTION SYSTEMS
TOTAL ENERGY SYSTEMS
Risk Assessment
Risks of energy systems, 8: 44007 (R:NL:In Dutch)

ENGINEERED SAFETY SYSTEMS
See also CONTAINMENT SYSTEMS
Performance Testing
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Seismic Effects
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Stress Analysis
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)

ENGINEERING DRAWINGS
Documentation
Plotting CV drawings on an electron-beam recorder, 8: 45317 (R:US)

ENHANCED RECOVERY
Research Programs
Flow in porous media, phase behavior and ultralow interfacial tensions: mechanisms of enhanced petroleum recovery. Final report, 8: 43270 (R:US)

ENVIRONMENT
Aquatic Ecosystems
Environmental modeling: ecosystems, 8: 44723 (RA:US)
Data Analysis
Proceedings of the interagency conference on the environment, 8: 43990 (R:US)
Environmental Policy
Cities, states, and national laboratories: an account of productive interaction, 8: 44003 (RA:US)
Research problems and issues in the application of land use controls to environmental protection, 8: 43997 (RA:US)
Information Systems
Workshop reports, 8: 44004 (RA:US)
Mathematical Models
Proceedings of the interagency conference on the environment, 8: 43990 (R:US)
Monitoring
EPA measurements and instrumentation program, 8: 43999 (RA:US)
Federal laboratories as centers of excellence in the environmental sciences: a case study, 8: 44002 (RA:US)
Monitoring environmental quality, 8: 43998 (RA:US)
Nuclear and x-ray techniques, 8: 44662 (RA:US)
Proceedings of the interagency conference on the environment, 8: 43990 (R:US)
Remote sensing for environmental protection, 8: 44000 (RA:US)
Survey of AEC and NASA capabilities in computerized data management, 8: 44001 (RA:US)
Workshop reports, 8: 44004 (RA:US)
Pollution
Federal government, the national laboratories, and the environment, 8: 43991 (RA:US)
Pollution Control
Development of technology for environmental control, 8: 43994 (RA:US)
Remote Sensing
Remote sensing of the environment, 8: 44661 (RA:US)
Research Programs
Mission and work programs of the Environmental Studies Division of EPA, 8: 43995 (RA:US)
Standards
Environmental standards, 8: 43993 (RA:US)

ENVIRONMENTAL IMPACTS
This descriptor is to be used to describe the possible effects on the environment from a proposed project.
Mathematical Models
SO2-, NOx- and dust-emissions in the energy model SELPE: an integrated energy/environmental model, 8: 44006 (R:NL:In Dutch)

ENVIRONMENTAL POLICY
Cities, states, and national laboratories: an account of productive interaction, 8: 44003 (RA:US)
Federal laboratories as centers of excellence in the environmental sciences: a case study, 8: 44002 (RA:US)
Planning
Development of technology for environmental control, 8: 43994 (RA:US)
Federal government, the national laboratories, and the environment, 8: 43991 (RA:US)

Mission and work programs of the Environmental Studies Division of EPA, 8: 43995 (RA:US)
Research problems and issues in the application of land use controls to environmental protection, 8: 43997 (RA:US)
Water system model development and applications within AEC and NASA laboratories, 8: 44724 (RA:US)

ENVIRONMENTAL PROTECTION AGENCY
See US EPA

ENVIRONMENTAL TEMPERATURE
See AMBIENT TEMPERATURE

ENVIRONMENTAL TRANSPORT
See also RADIONUCLIDE MIGRATION
Workshop reports, 8: 44004 (RA:US)
Computer Codes
CHEMTRN user's manual, 8: 44744 (R:US)

EOR
See ENHANCED RECOVERY

EPA
See US EPA

EPILEPSY
Diagnosis
Some radiopharmaceuticals derived from carbon-eleven labelled phosgene. Synthesis and clinical application, 8: 44770 (R:NL)

EPOXIDES
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
Physical Radiation Effects
Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution, 8: 43340 (R:GB)

EPOXY COMPOUNDS
See EPOXIDES

EQUATIONS (DIFFERENTIAL)
See DIFFERENTIAL EQUATIONS

EQUILIBRIUM PLASMA
Plasma Instability
Comparison of two approaches for solving equilibrium problems for axisymmetric current-carrying plasmas, 8: 45153 (R:NL)

EQUIPMENT
Use of a more specific term is recommended.
See also CAPACITIVE ENERGY STORAGE EQUIPMENT
DISTILLATION EQUIPMENT
DRILLING EQUIPMENT
ELECTRICAL EQUIPMENT
HEAT RECOVERY EQUIPMENT
LABORATORY EQUIPMENT
MATERIALS HANDLING EQUIPMENT
MINING EQUIPMENT
PARTICLE SIZE CLASSIFIERS
POLLUTION CONTROL EQUIPMENT
SAMPLERS
THERMAL ENERGY STORAGE EQUIPMENT
Failures
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)
Inspection
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)
Maintenance
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)
Modifications
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)
Repair
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)

ERBIUM
Fluorescence Spectroscopy
Selective laser excitation of terbium(III) in lanthanum(III) fluoride precipitates, 8: 44330 (J:US)

ERBIUM 166
Moessbauer Effect
Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)

ERBIUM BORIDES
Critical Field
Type-II to type-I transition in superconducting, sputtered $ErRh_4B_4$ films, 8: 44250 (J:US)
Superconductivity
Effect of superconductivity on spin dynamics in (Y/sub 1-x/R/sub x/)Rh_4B_4, 8: 44252 (J:US)

ERBIUM SILICIDES
Crystal Field
Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)
Magnetization
Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)

EROSION
Test Facilities
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

ES COMPUTERS
Computer Graphics
Unified software of the ES-1040 computer for organization of graphic data representation in program packages of the "Disc-2" and "SYaO" real time systems, 8: 45295 (R:SU:In Russian)

ESCHERICHIA COLI
Radiosensitivity
Correlation of radiation sensitivity and nitrofurantoin sensitivity of Escherichia coli K-12, 8: 44796 (R:DE:In German)

ESTERASES
Code number 3.1.
Inactivation
Analogous mechanisms of biological damage induced by ascorbate and superoxide in the presence of copper. Progress report, July 1982-June 1983, 8: 44758 (R:US)

ESTUARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS

ETHANE
Ignition Quality
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)

ETHANOL
Biosynthesis
Alcohol production from sugar mixtures by Pachysolen tannophilus, 8: 43464 (J:US)
Comparison of Candida tropicalis and Pachysolen tannophilus for conversion of xylose to ethanol, 8: 43460 (J:US)
Continuous fermentation: improvement of cell immobilization by zeta potential measurement, 8: 44784 (J:US)
Shift in metabolism towards ethanol production in Saccharomyces cerevisiae by addition of metabolic inhibitors, 8: 43466 (J:US)
Use of immobilized cells of Zymomonas mobilis in a novel fluidized bioreactor to produce ethanol, 8: 43463 (J:US)
Conversion
Catalytic conversion of fermentation derived ethanol to gasoline, 8: 43444 (J:US)
Cost
Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes, 8: 43453 (R:US)
Extraction
Repeated fed-batch rapid fermentation using yeast cells and activated carbon extraction system, 8: 43469 (J:US)
Ignition Quality
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)
Production
Environmental characterization of corn-based fuel ethanol plants, 8: 43455 (BA:US)
Fermentation studies on extracts of beet, 8: 43452 (R:NZ)

Fermentation of wheat straw hemicelluloses to ethanol by Pachysolen tannophilus, 8: 43458 (J:US)
Fermentation of cellulose and hemicellulose carbohydrates by thermotolerant yeasts, 8: 43459 (J:US)
Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes, 8: 43453 (R:US)
Saccharification and ethanol fermentation of apple pomace, 8: 43465 (J:US)
Shift in metabolism towards ethanol production in Saccharomyces cerevisiae using alterations of the physical-chemical microenvironment, 8: 43467 (J:US)
Thermochemical conversion of biomass to ethanol. Final report, 8: 43451 (R:US)

Recovery
Extraction of organics from aqueous solutions using critical-fluid carbon dioxide, 8: 43468 (J:US)
Repeated fed-batch rapid fermentation using yeast cells and activated carbon extraction system, 8: 43469 (J:US)

ETHANOL FUELS
Use for pure ethanol, ethanol-water mixtures, or ethanol with additives; for ethanol-gasoline mixtures, use GASOHOL.

Net Energy
High-temperature acid hydrolysis of cellulose for alcohol fuel production, 8: 43454 (R:US)

Parametric Analysis
High-temperature acid hydrolysis of cellulose for alcohol fuel production, 8: 43454 (R:US)

Solvent Extraction
Extraction of organics from aqueous solutions using critical-fluid carbon dioxide, 8: 43468 (J:US)

ETHANOL PLANTS

Air Pollution
Environmental characterization of corn-based fuel ethanol plants, 8: 43455 (BA:US)

By-Products
Uses of by-product lignins from alcohol fuel processes, 8: 43457 (J:US)

Distillation Equipment
Use of plastic construction materials in small-scale fuel alcohol production, 8: 43524 (J:US)

Economic Analysis
Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes, 8: 43453 (R:US)

Environmental Effects
Environmental characterization of corn-based fuel ethanol plants, 8: 43455 (BA:US)

Flowsheets
Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes, 8: 43453 (R:US)

Occupational Safety
Environmental characterization of corn-based fuel ethanol plants, 8: 43455 (BA:US)

Waste Product Utilization
Uses of by-product lignins from alcohol fuel processes, 8: 43457 (J:US)

Water Pollution
Environmental characterization of corn-based fuel ethanol plants, 8: 43455 (BA:US)

ETHINE
See ACETYLENE

ETHOCEL
See CELLULOSE

ETHYL ALCOHOL
See ETHANOL

ETHYLENE

Chemical Reaction Kinetics
Selective vibrational excitation of the ethylene—fluorine reaction in a nitrogen matrix. II, 8: 44352 (J:US)

Molecular Structure
Molecular structure of hydrocarbon monolayers on metal surfaces, 8: 44353 (J:US)

Photochemical Reactions
Selective vibrational excitation of the ethylene—fluorine reaction in a nitrogen matrix. II, 8: 44352 (J:US)

ETHYNE
See ACETYLENE

EUROPEAN COMMUNITIES

BWR Type Reactors
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)

PWR Type Reactors
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)

EUROPIUM 147

Energy Levels
Nuclear structure of the low lying levels of ^{147}Eu from γ-γ directional correlation measurements on ^{147}Eu, 8: 45008 (J:US)

EUROPIUM BORIDES

Magnetization
Observation of a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2, 8: 44247 (J:US)

Phase Transformations
Observation of a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2, 8: 44247 (J:US)

Superconductivity
Observation of a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2, 8: 44247 (J:US)

EUROPIUM OXIDES

Correlation Functions
Correlation theory for one dynamical variable: Application to EuO and EuS, 8: 44254 (J:US)

Magnetic Properties
Correlation theory for one dynamical variable: Application to EuO and EuS, 8: 44254 (J:US)

EUROPIUM SULFIDES

Correlation Functions
Correlation theory for one dynamical variable: Application to EuO and EuS, 8: 44254 (J:US)

Magnetic Properties
Correlation theory for one dynamical variable: Application to EuO and EuS, 8: 44254 (J:US)

EUTECTICS

Crystal Growth
Semiconductor eutectics for energy conversion. Final report, 8: 43511 (R:US)

Electrical Properties
Semiconductor eutectics for energy conversion. Final report, 8: 43511 (R:US)

EVALUATED NUCLEAR DATA FILE
See NUCLEAR DATA COLLECTIONS

EVAPORITES

Deformation
Petrographic study of evaporite deformation near the Waste Isolation Pilot Plant (WIPP), 8: 43385 (R:US)

Petrography
Petrographic study of evaporite deformation near the Waste Isolation Pilot Plant (WIPP), 8: 43385 (R:US)

EXCHANGE (HEAT)
See HEAT TRANSFER

EXHAUST GASES

Mass Spectroscopy
Criticism on the mass spectra of some polycyclic aromatic compounds detected in automobile exhaust gas, 8: 44684 (RA:DE:In German)

Polycyclic Aromatic Hydrocarbons
Criticism on the mass spectra of some polycyclic aromatic compounds detected in automobile exhaust gas, 8: 44684 (RA:DE:In German)

EXPLOSIVE FRACTURING

Computerized Simulation
Simulation of rock blasting with the SHALE code, 8: 43302 (R:US)

Constraints
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)

Cost
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)
Economics
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)
Fragmentation
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)
Optimization
High-energy gas-fracturing develpoment. Annual report, April 1982-March 1983, 8: 43296 (R:US)
Performance Testing
High-energy gas-fracturing develpoment. Annual report, April 1982-March 1983, 8: 43296 (R:US)
Regulations
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)
Research Programs
High-energy gas-fracturing develpoment. Annual report, April 1982-March 1983, 8: 43296 (R:US)

EXPORTS
Embargoes
Technology transfer to the East: an annotated bibliography for 1976 to 1981, 8: 43981 (R:US)

EXPOSURE (RADIATION DOSES)
See RADIATION DOSES

EXTENSOMETERS
Design
Head assembly for multiposition borehole extensometer, 8: 44651 (P:US)

EXTRACTION (BEAM)
See BEAM EXTRACTION

EXTRACTION COLUMNS
Commercialization
Scale-up procedures for a Scheibel extraction column, 8: 43218 (R:US)

EXXON GASIFICATION PROCESS
Catalysts
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)
Energy Balance
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)
Separation Processes
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)

F

FACILITIES (EDUCATIONAL)
See EDUCATIONAL FACILITIES

FACILITIES (NUCLEAR)
See NUCLEAR FACILITIES

FACILITIES (RESOURCE RECOVERY)
See RESOURCE RECOVERY FACILITIES

FACILITIES (TEST)
See TEST FACILITIES

FALLOUT SHELTERS
Feasibility Studies
Preliminary evaluation of crisis-relocation fallout-shelter options. Volume 2. Detailed analysis, 8: 44652 (R:US)

FARADAY GENERATORS
See MHD GENERATORS

FARMS
Energy Source Development
On-farm biomass program, 8: 43506 (RA:US)

FAST BREEDER TYPE REACTORS
See FBR TYPE REACTORS

FAST REACTORS
See also FBR TYPE REACTORS
IBR-2 REACTOR
IBR-30 REACTOR
Cross Sections
Comparative analysis of CARNAVAL II Library, 8: 43804 (RA:BR:In Portuguese)
Fuel Pellets
Fabrication of plutonium fuel for fast neutron reactors, 8: 43800 (R:FR:In French)
Pulsed Neutron Techniques
Experimental fast reactors: self-sustained symetric and asymetric oscillations and viability as a source of pushed neutrons, 8: 43888 (RA:BR:In Portuguese)
Reactor Kinetics
Calculation of integral parameters sensitivity in fast reactors, 8: 43807 (RA:BR:In Portuguese)
Comparative analysis of CARNAVAL II Library, 8: 43804 (RA:BR:In Portuguese)
Sensitivity analysis of U^{238} cross sections in fast nuclear systems-SENSEAV-R computer code, 8: 43806 (RA:BR:In Portuguese)
Reactor Stability
Experimental fast reactors: self-sustained symetric and asymetric oscillations and viability as a source of pushed neutrons, 8: 43888 (RA:BR:In Portuguese)

FAST-MIXED SPECTRUM REACTOR
See FBR TYPE REACTORS

FBR TYPE REACTORS
See also GCFR TYPE REACTORS
LMFBR TYPE REACTORS
Fuel Cans
Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures, 8: 43810 (R:DE:In German)
Fuel Management
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)

FEDERAL BUILDINGS
Design
Results of the test application of the Process Standard, 8: 44075 (R:US)
Energy Efficiency
Results of the test application of the Process Standard, 8: 44075 (R:US)
Energy Efficiency Standards
Development of a building energy-code input form, 8: 44072 (R:US)

FEDERAL ENERGY REGULATORY COMMISSION
See US FERC

FEDERAL GOVERNMENT
See NATIONAL GOVERNMENT

FEDERAL REGION IX
Prior to June 1982 this concept was indexed to WESTERN REGION.
See also CALIFORNIA
NEVADA
Air Pollution Abatement
In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 4. Federal Regions VIII, IX, and X, 8: 44658 (R:US)

FEDERAL REGION VIII
Prior to June 1982 this concept was indexed to ROCKY MOUNTAIN REGION.
See also COLORADO
UTAH
WYOMING
Air Pollution Abatement
In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 4. Federal Regions VIII, IX, and X, 8: 44658 (R:US)

FEDERAL REGION X
Prior to June 1982 this concept was indexed to PACIFIC NORTHWEST REGION.
See also ALASKA
OREGON
WASHINGTON
Air Pollution Abatement
In pursuit of clean air: a data book of problems and strategies at the state level, 1982 update. Volume 4. Federal Regions VIII, IX, and X, 8: 44658 (R:US)

FEDERAL REPUBLIC OF GERMANY
Atomic Energy Agreements
Economical and strategical aspects of Brazilian-Germany nuclear agreement, 8: 44016 (R:BR:In Portuguese)
Energy Conservation
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors, 8: 44025 (R:DE:In German)
Energy Sources
Data concerning the development of the energy economy of the Federal Republic of Germany in 1981, 8: 43983 (R:DE:In German)
Energy Supplies
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Environmental Policy
Dirt management in Ruhr coal mines, 8: 43220 (R:DE:In German)
Government Policies
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors, 8: 44025 (R:DE:In German)
Nuclear Power Plants
Sensitivity analysis of the meteorological model applied in the German risk study (DRS), 8: 43878 (BA:US)
Radioactive Waste Disposal
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
Reactor Safety
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
Reactor Technology
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
Renewable Energy Sources
Long-term energy sources, 8: 44053 (B:DE:In German)
Salt Deposits
Brine migration test for Asse Mine, Federal Republic of Germany: final test plan, 8: 43367 (R:US)
Solar Energy
Briefing package: Solar energy for hot water preparation and space heating. Pt. 2, 8: 43643 (R:DE:In German)
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
FEED MATERIALS PLANTS
Nuclear Materials Management
Data-acquisition system for the NLO error-propagation exercise, 8: 43407 (R:US)
Pilot Plants
Operating experience in the J.E.N. with a fluidized-bed pilot plant, 8: 43327 (TJ:US)
FERMENTATION
By-Products
Utilization of the fermentor off-gases from an acetone-butanol fermentation, 8: 43470 (J:US)
Gaseous Wastes
Utilization of the fermentor off-gases from an acetone-butanol fermentation, 8: 43470 (J:US)
Waste Product Utilization
Utilization of the fermentor off-gases from an acetone-butanol fermentation, 8: 43470 (J:US)
FERMENTATION ALCOHOL
See ETHANOL
FERMILAB ACCELERATOR
Facility at Fermi National Accelerator Laboratory, Batavia, Illinois, includes main synchroton, booster synchrotron, and linac.
Particle Sources
Calculation of antoproton yields for the Fermilab Antiproton Source, 8: 44555 (J:NL)
FERMIONS
See also BARYONS
Many-Body Problem
Comparison of upper and lower bound methods using a soluble many-Fermion model, 8: 45032 (J:US)
Comparison of Paris potential results for the zero and continuous particle spectrum, 8: 45033 (J:US)
FERRITIC STEELS
Corrosion Fatigue
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Crack Propagation
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Fractography
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Mechanical Properties
Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983, 8: 44132 (R:US)
Microstructure
Investigation of microstructural changes in ferritic stainless steels caused by high-temperature deformation. Technical progress report, July 1, 1982-July 1, 1983, 8: 44132 (R:US)
Physical Radiation Effects
Swelling behavior of ferrites and austenites exposed to heavy ions, 8: 44169 (RA:DE:In German)
Swelling
Swelling behavior of ferrites and austenites exposed to heavy ions, 8: 44169 (RA:DE:In German)
FERROMAGNETISM
Ising Model
Exact solution of a one-dimensional Ising model in a random magnetic field, 8: 45077 (J:US)
FERTILIZERS
Market
Fertilizer trends 1982, 8: 44009 (R:US)
Prices
Fertilizer trends 1982, 8: 44009 (R:US)
Production
Fertilizer trends 1982, 8: 44009 (R:US)
Research Programs
Fertilizer trends 1982, 8: 44009 (R:US)
Supply and Demand
Fertilizer trends 1982, 8: 44009 (R:US)
FIBERGLASS
Radiant Heat Transfer
Radiative heat transfer in fibrous insulations: Part 1: Analytical study, 8: 44437 (J:US)
Radiative heat transfer in fibrous insulations: Part II: Experimental study, 8: 44438 (J:US)
FIBERS
See also OPTICAL FIBERS
Radiant Heat Transfer
Radiative heat transfer in fibrous insulations: Part 1: Analytical study, 8: 44437 (J:US)
FIBRIN
Complexes
Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers, 8: 44363 (R:DE:In German)
FIBRINOGEN
Labelling
Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers, 8: 44363 (R:DE:In German)
FIELD EFFECT TRANSISTORS
Physical Radiation Effects
Transient response of GaAs microwave power FET to x-ray pulses, 8: 44626 (R:US)

FIELD THEORIES
Research Programs
Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983 (Brandeis University), 8: 44911 (R:US)
FIELD-REVERSED MIRROR REACTORS
Energy Transport
A variance reduction technique for coulomb-nuclear thermalization of energetic fussion products in hot plasmas, 8: 45193 (J:US)
Reactor Start-Up
A one-dimensional hybrid code for FRM startup, 8: 45281 (J:US)
FIELDS (ELECTROMAGNETIC)
See ELECTROMAGNETIC FIELDS
FILTERS
See also MAGNETIC FILTERS
OPTICAL FILTERS
Efficiency
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Mathematical Models
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Mica
Mica nuclear track filters. Production, properties and applications, 8: 44386 (RA:DE)
FINGERPRINTING (OIL SPILLS)
See OIL SPILLS
PATTERN RECOGNITION
FINITE DIFFERENCE METHOD
Compressible Flow
Finite size fluid particle in nonuniform moving grid, 8: 45111 (R:JP)
FINITE ELEMENT METHOD
Neutron Diffusion Equation
Synthesis method with finite elements for diffusion calculations, 8: 43847 (RA:BR:In Portuguese)
FIRE STATIONS
See PUBLIC BUILDINGS
FIREDAMP
See METHANE
FIREWOOD
See WOOD FUELS
FIRST WALL
Design
FED-A, an advanced performance FED based on low safety factor and current drive, 8: 45256 (R:US)
Electric Arcs
Features of arc formation on the limiter with a dielectric film in current discharge, 8: 45237 (RA:SU:In Russian)
FISCHER-TROPSCH SYNTHESIS
Catalysts
Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981 (F-T/ZSM-5 process), 8: 43423 (R:US)
Chemical Reactors
Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981 (F-T/ZSM-5 process), 8: 43423 (R:US)
FISHES
Contamination
Toxicity studies of mercury in Japan, 8: 44743 (R:SE:In Swedish)
FISSION
Kinetics
Fission dynamics simplified, 8: 45036 (J:NL)
FISSION FOIL DETECTORS
Design
Neutron detection apparatus, 8: 44624 (P:US)
FISSION PRODUCT RELEASE
Coordinate with descriptors for the area of release such as BIOSPHERE or COOLANTS, and for the specific fission products, if known.
Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup (PWR; BWR), 8: 43747 (R:US)
Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500, 8: 43922 (R:DE:In German)
Activity Levels
Secondary emissions from secondary loop of light-water reactors in normal operation and during selected incidents, 8: 43965 (B:DE:In German)
Radioactivity Transport
Secondary emissions from secondary loop of light-water reactors in normal operation and during selected incidents, 8: 43965 (B:DE:In German)
FISSIONABLE MATERIALS MANAGEMENT
See NUCLEAR MATERIALS MANAGEMENT
FISSURED FORMATIONS
See FRACTURED RESERVOIRS
FIXED MIRROR COLLECTORS
Construction
An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures, 8: 43649 (J:GB)
Design
An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures, 8: 43649 (J:GB)
Testing
An experimental investigation of a stationary reflector/tracking absorber solar collector at intermediate temperatures, 8: 43649 (J:GB)
FLAMES
Raman Spectroscopy
Instantaneous Ramanography of a turbulent diffusion flame, 8: 44369 (J:US)
Temperature Measurement
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)
FLASKS
See CASKS
FLORIDA
Vertebrates
Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts, 8: 43286 (R:US)
FLOW (FLUID)
See FLUID FLOW
FLOW REGULATORS
See also VALVES
Specifications
Estimation of bias shifts in a steam-generator water-level controller, 8: 43869 (R:US)
FLOWMETERS
Calibration
Metrology installation for studies of the accuracy of correlation methods for sodium flow rate measurements, 8: 43812 (R:SU:In Russian)
FLUE GAS
Air Pollution
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Chemical Analysis
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2, 8: 43224 (R:US)
Denitrification
Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8: 43214 (R:US)
Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
Desulfurization
Design of an electron-beam flue gas cleanup process development unit. Final technical report, 28 September 1981-28 June 1982, 8: 43214 (R:US)

Electron beam flue gas cleanup process development unit: size reduction and cost impact study. Supplementary technical report, 4 October 1982-31 March 1983, 8: 43215 (R:US)
Flue gas desulphurization in a spray tower with de-coupled recycling of soda ash, 8: 43735 (R:DE:In German)
Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8: 43197 (RA:DK)
Sulfate aerosols from western low-rank coal-fired boilers with FGD: summary of tests at Coal Creek, Clay Boswell, Milton R. Young, and San Miguel stations. MRI-83-FR-1849, 8: 43213 (R:US)

Waste Disposal
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)

FLUID FLOW
See also COMPRESSIBLE FLOW
GAS FLOW
INCOMPRESSIBLE FLOW
LAMINAR FLOW
TURBULENT FLOW
TWO-PHASE FLOW
VISCOUS FLOW

Pressure Drop
Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle, 8: 44422 (R:BR:In Portuguese)

Pressure Measurement
Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle, 8: 44422 (R:BR:In Portuguese)

Roughness
Resistance characteristics of rough open channels with a rigid boundary, 8: 44433 (R:DE)

FLUID INJECTION
See also GAS INJECTION
STEAM INJECTION

Field Tests
Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report, 8: 43272 (R:US)

FLUIDIZED BED
Operating experience in the J.E.N. with a fluidized-bed pilot plant, 8: 43327 (TJ:US)

Fluidization
Davies-Taylor equation for the fluidization bubble, 8: 44419 (R:BR)

Two-Phase Flow
Davies-Taylor equation for the fluidization bubble, 8: 44419 (R:BR)

FLUIDIZED BED BOILERS

Manufacturers
Rapidly expanding US market for industrial scale fluidized bed combustion, 8: 43258 (RA:US)

Market
Rapidly expanding US market for industrial scale fluidized bed combustion, 8: 43258 (RA:US)

FLUIDIZED BED REACTORS

Construction
Steam gasification of wood in a fluidized bed using indirect heating with fire tubes, 8: 43426 (RA:US)

Design
Development of an indirectly heated pyrolysis reactor, 8: 43430 (RA:US)
Steam gasification of wood in a fluidized bed using indirect heating with fire tubes, 8: 43426 (RA:US)

Operation
Steam gasification of wood in a fluidized bed using indirect heating with fire tubes, 8: 43426 (RA:US)

Uses
Fluidized-bed energy technology for biomass conversion, 8: 43443 (J:US)

FLUIDIZED-BED COMBUSTION

Commercialization
Rapidly expanding US market for industrial scale fluidized bed combustion, 8: 43258 (RA:US)

Meetings
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)

Uses
New solution of energy problems for industrial operation by cogeneration, 8: 44093 (R:DE:In German)

FLUIDIZED-BED COMBUSTORS

Construction
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)

Design
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)

Emission
Planning, construction and operation of the 6 MWsub(th)-test facility Koenig Ludwig for firing bituminous coal in an atmospheric fluidized bed furnace, 8: 43257 (R:DE:In German)

Heat Flux
Measurements of heat radiation in a fluidized bed combustor, 8: 43261 (R:SE:In Swedish)

Manufacturers
Rapidly expanding US market for industrial scale fluidized bed combustion, 8: 43258 (RA:US)

Market
Rapidly expanding US market for industrial scale fluidized bed combustion, 8: 43258 (RA:US)

Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

Test Facilities
Planning, construction and operation of the 6 MWsub(th)-test facility Koenig Ludwig for firing bituminous coal in an atmospheric fluidized bed furnace, 8: 43257 (R:DE:In German)

Testing
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)

Waste Disposal
Development of potential uses for the residue from fluidized-bed-combustion processes. Final report covering results of research program and recommended practices for potential users, 8: 44096 (R:US)

Waste Processing
Development of potential uses for the residue from fluidized-bed-combustion processes. Final report covering results of research program and recommended practices for potential users, 8: 44096 (R:US)

FLUORANTHENE
See CONDENSED AROMATICS

FLUORESCENCE SPECTROSCOPY

Fiber Optics
Use of fiber optics and laser-induced fluorescence for remote measurements of UF_6 in strong rotation, 8: 44639 (R:US)

FLUORESCENT CONCENTRATORS
See LUMINESCENT CONCENTRATORS

FLUORIMETRY
See FLUORESCENCE SPECTROSCOPY

FLUORINATED ALIPHATIC HYDROCARBONS
See also POLYTETRAFLUOROETHYLENE

Dissociation
Infrared multiphoton dissociation of 1-chloro-1-fluoro ethylene: Competitive reactions and pressure dependence, 8: 44885 (J:US)

FLUORINE
Chemical Reaction Kinetics
Selective vibrational excitation of the ethylene—fluorine reaction in a nitrogen matrix. II, 8: 44352 (J:US)
Photochemical Reactions
Selective vibrational excitation of the ethylene—fluorine reaction in a nitrogen matrix. II, 8: 44352 (J:US)
FLUORINE 19
Pion Minus Reactions
Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction, 8: 44984 (J:US)
FLUORINE 19 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
FLUORINE FLUORIDES
See FLUORINE
FLUXGATE MAGNETOMETERS
Design
Portable fluxgate magnetometer for non-invasive measurement of occupationally acquired lung dust. Progress report, September 15, 1982-September 14, 1983, 8: 44766 (R:US)
Diagnostic Uses
Portable fluxgate magnetometer for non-invasive measurement of occupationally acquired lung dust. Progress report, September 15, 1982-September 14, 1983, 8: 44766 (R:US)
FLY ASH
Chemical Analysis
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
Kiln dust-fly ash systems for highway bases and subbases, 8: 44100 (R:US)
Environmental Impacts
Water pollution arising from solid waste (coal, fly ash, slag) disposal, and measures to prevent water pollution, 8: 44739 (RA:DK)
Environmental Transport
Model of ion equilibrium in aqueous solutions of fly ash in the context of prediction of ground and surface water contamination, 8: 44737 (RA:DK)
Ground Disposal
Use of "The Capillary Barrier" as a shield against ground-water pollution from fly-ash deposits, 8: 43203 (RA:DK)
Leachates
Disposal of waste material. Evaluation in the KHM project of short and long-term effects, 8: 43195 (RA:DK)
Leaching
Comparison of different methods for estimating the leaching of heavy metals from coal combustion waste, 8: 43202 (RA:DK)
Studies on the leaching and weathering processes of coal ashes, 8: 43201 (RA:DK)
Marine Disposal
Marine disposal of fly ash from coal fired power plants, 8: 43198 (RA:DK)
Marine disposal of fly ash from coal fired power plants, 8: 43210 (RA:DK)
Ocean disposal and construction with stabilized coal waste blocks, 8: 43196 (RA:DK)
Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8: 43197 (RA:DK)
Pilot Plants
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Surface Properties
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
Temperature Effects
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
Waste Disposal
Aquatic effects of wet ash disposal and wet limestone scrubber systems, 8: 43211 (RA:DK)
Ash disposal at super thermal power stations in India, 8: 43204 (RA:DK)
Coal-fired power generation in Ontario - A 60 year phenomenon coal ash disposal in Ontario. A 1000 year legacy, 8: 43194 (RA:DK)
Disposal of waste material. Evaluation in the KHM project of short and long-term effects, 8: 43195 (RA:DK)
Disposal of fly ash and wastewater using low-water hydraulic transport technique as a method for protection of surface and underground water from contamination, 8: 43209 (RA:DK)
Fly ash production, utilization and disposal, 8: 43205 (RA:DK)
Waste Product Utilization
Fly ash production, utilization and disposal, 8: 43205 (RA:DK)
Ocean disposal and construction with stabilized coal waste blocks, 8: 43196 (RA:DK)
Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8: 43197 (RA:DK)
Prevention of water pollution by the use of fly-ash as a substitute for extracted raw materials, 8: 43206 (RA:DK)
Water Pollution Abatement
Use of "The Capillary Barrier" as a shield against ground-water pollution from fly-ash deposits, 8: 43203 (RA:DK)
FLYWHEEL ENERGY STORAGE
Coordinated Research Programs
Proposed coordinated research program of energy storage in flywheels. Project preparation group 'Flywheels', 8: 43970 (R:NL:In Dutch)
Research program of energy storage in flywheels. Results and recommendations, 8: 44010 (R:NL:In Dutch)
Uses
Research program of energy storage in flywheels. Results and recommendations, 8: 44010 (R:NL:In Dutch)
FOKKER-PLANCK COEFFICIENTS
See FOKKER-PLANCK EQUATION
FOKKER-PLANCK EQUATION
Collision Integrals
Magnetic scalar potentials, 8: 45133 (RA:CS)
FOOD INDUSTRY
See also MEAT INDUSTRY
Energy Audits
Total energy requirements of shopping for food (Supermarkets, Grocery Stores, Dairies, Butcheries, New Zealand), 8: 44048 (R:NZ)
Total energy requirements of food retailing (Grocery Stores, Supermarkets, Dairies, Butcheries, New Zealand), 8: 44047 (R:NZ)
FORCED CONVECTION
Computer Calculations
Slow forced and free convection in inclined channels, 8: 44415 (R:BR)
Numerical Solution
Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above, 8: 44424 (R:BR)
FORGING
Flow Stress
Slip-line field analysis of metal flow during two dimensional forging, 8: 44378 (R:BR)
FORMALDEHYDE
Ecological Concentration
Chemical characterization of emmissions from wood-fired stoves, 8: 43510 (R:NO:In Norwegian)
FORMALIN
See FORMALDEHYDE
FORMALITH
See FORMALDEHYDE
FORMIC ALDEHYDE
See FORMALDEHYDE
FORMOL
See FORMALDEHYDE
FORSCHUNGSREAKTOR BERLIN-2
See BER-2 REACTOR
FOSSIL-FUEL POWER PLANTS
Air Pollution Control
Dust emission, its quantity and composition, depending on dust collector; coal quality etc., 8: 43207 (RA:DK)

Capitalized Cost
Quality coal for electric utility use, 8: 43726 (RA:US)
Combustion Products
Spatial distribution of the trace element emission from conventional thermal power plants in Europe, 8: 44682 (R:NO)
Computerized Control Systems
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)
Cooling Systems
Measurement of jet propagation in the intermediate near-field of a coolant water outlet, 8: 44751 (R:DE:In German)
Cost
Program reference book for the Energy Economic Data Base Program (EEDB), 8: 43828 (R:US)
Demonstration Programs
Economic potential for cleaned coal water slurries: a utility perspective, 8: 43260 (RA:US)
Dusts
Dust emission, its quantity and composition, depending on dust collector; coal quality etc., 8: 43207 (RA:DK)
Economics
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Energy Economic Data Base Program (EEDB). Phase V update (1982) report, 8: 43827 (R:US)
Quality coal for electric utility use, 8: 43726 (RA:US)
Environmental Effects
Aquatic effects of wet ash disposal and wet limestone scrubber systems, 8: 43211 (RA:DK)
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Thermal power plant emission: effect on ecosystem, 8: 43736 (RA:DK)
Environmental Impacts
Treatment of alkaline wastewater from lignite-fired power plants, 8: 43200 (RA:DK)
Trends in energy production, 8: 44033 (RA:DK)
Fuel Substitution
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)
Health Hazards
Determination of human exposure using measured data of Cd, As and Pb, 8: 43241 (R:NO)
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Peak Load
Low-cost peaking capability built into base-load coal-fired power plants, 8: 43725 (R:US)
Pollution Control
Emissions from coal utilization facilities and possible abatement measures, 8: 43239 (R:DE:In German)
Retrofitting
Economic potential for cleaned coal water slurries: a utility perspective, 8: 43260 (RA:US)
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)
New England Electric coal conversion experience, 8: 43729 (RA:US)
Thermal Effluents
Biological monitoring of thermal effects of cooling water discharges from Danish power plants, 8: 44804 (RA:DK)
Water quality and the discharge of cooling water into rivers, lakes and coastal waters, 8: 44750 (RA:DK)
Waste Water
Treatment of alkaline wastewater from lignite-fired power plants, 8: 43200 (RA:DK)
Water Pollution
Aquatic effects of wet ash disposal and wet limestone scrubber systems, 8: 43211 (RA:DK)
Water Treatment
Chlorination of cooling waters-mechanism, 8: 43208 (RA:DK)

FOWL
Radiopasteurization
Salmonella radicidation of poultry carcasses, 8: 44793 (R:NL)
FRACTURED FORMATIONS
See FRACTURED RESERVOIRS
FRACTURED RESERVOIRS
Fluid Flow
GMINC: a mesh generator for flow simulations in fractured reservoirs, 8: 43269 (R:US)
Heat Transfer
GMINC: a mesh generator for flow simulations in fractured reservoirs, 8: 43269 (R:US)
FRANCE
Fast Reactors
Comparative analysis of CARNAVAL II Library, 8: 43804 (RA:BR:In Portuguese)
Nuclear Power Plants
Methodology and practical basis for emergency planning in case of accidental releases, 8: 43880 (BA:US)
PCOTPL
Act N° 65-954 of 12 November 1965 authorizing ratification of: 1. the Convention on Third Party Liability in the Field of Nuclear Energy, signed in Paris on 29 July 1960 and its Additional Protocol, signed in Paris on 28 January 1964; 2. the convention Supplementary to the Paris Convention of 29 July 1960, signed in Brussels on 31 January 1963, and its Additional Procol, signed in Paris on 28 January 1964, 8: 44021 (R:FR:In French)
Decree N° 69-154 of 6 February 1969 publishing the Convention on Third Party Liability in the Field of Nuclear Energy of 29 July 1960 and the Additional protocol thereto of 28 January 1964, 8: 44022 (R:FR:In French)
FRANCKENSTEIN
See SCANNING MEASURING PROJECTORS
FREE CONVECTION
See NATURAL CONVECTION
FREE ELECTRON LASERS
Electric Discharges
Density and temperature variations in pulsed discharge lasers, 8: 44403 (J:US)
Plasma Simulation
Particle simulation of plasmas, 8: 45189 (J:US)
Temperature Measurement
Density and temperature variations in pulsed discharge lasers, 8: 44403 (J:US)
FRESH WATER ECOSYSTEMS
See AQUATIC ECOSYSTEMS
FRICKE DOSEMETERS
See CHEMICAL DOSEMETERS
FRM DEVICES (THERMONUCLEAR)
See FIELD-REVERSED MIRROR REACTORS
FRUIT (SEEDS)
See SEEDS
FUCUS
Metabolism
Fucus Vesiculosus as a bioaccumulator of heavy metals, 8: 44807 (R:DE:In German)
FUEL ASSEMBLIES
See also FUEL ELEMENT CLUSTERS
Damage
Overview of the PBF Severe-Fuel-Damage Program and results of the first test (PWR), 8: 43903 (R:US)
Meetings
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Neutron Flux
EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms, 8: 43766 (R:SU:In Russian)
Performance Testing
Irradiation in the CAP reactor of FRAGEMA fuel assemblies under power transients representative of super imposed load follow and remote control regimes, 8: 43762 (R:FR)

Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Physical Radiation Effects
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Power Density
EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms, 8: 43766 (R:SU:In Russian)
Thermal Stresses
Overview of the PBF Severe-Fuel-Damage Program and results of the first test (PWR), 8: 43903 (R:US)

FUEL BUNDLES
See FUEL ELEMENT CLUSTERS

FUEL CANS
Crack Propagation
Subcritical crack growth in underclad region, 8: 44193 (RA:US)
Creep
Corrosion-enhanced creep-rupture of Cr-Ni-steel cladding tubes at high temperatures, 8: 43810 (R:DE:In German)
Deformation
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description (PWR), 8: 43897 (R:GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes (PWR), 8: 43898 (R:GB)
UK MT-3 ballooning test in the Battelle NRU loop (PWR), 8: 43896 (R:GB)
Eddy Current Testing
Immersed multipurpose device for the inspection of PWR spent pencils in a loop reloaded in the Osiris pool, 8: 43883 (R:FR:In French)
Heat Transfer
Kalman filter-based gap conductance modeling (PWR; BWR), 8: 43748 (R:US)
Thermal Stresses
Experiment operations plan for the MT-3 experiment in the NRU reactor (PWR), 8: 43937 (R:US)

FUEL CELLS
See also BIOCHEMICAL FUEL CELLS
Industrial power: electrical rates, reliability, and energy management, 8: 43734 (B:US)
Electrochemistry
Electrochemical and surface science research on fuel cells, 8: 44054 (RA:US)
Electrodes
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Electrolytes
Low hydrostatic head electrolyte addition to fuel cell stacks, 8: 44058 (P:US)
Interconnected Power Systems
Task 4 completion report for 40-kilowatt grid-connected modification contract, 8: 44056 (R:US)
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Power Conditioning Circuits
Task 4 completion report for 40-kilowatt grid-connected modification contract, 8: 44056 (R:US)
Research Programs
Electrochemical and surface science research on fuel cells, 8: 44054 (RA:US)

FUEL CHANNELS
Temperature Gradients
URANUS investigations on coolant channel temperature for Mol 7c (LMFBR), 8: 43924 (RA:DE:In German)

FUEL COOLING INSTALLATIONS
See SPENT FUEL STORAGE

FUEL CYCLE
See also THORIUM CYCLE
Nuclear-fuel-cycle education: Module 1. Nuclear fuel cycle overview, 8: 43330 (R:US)
Economics
Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8: 43830 (R:US)
Environmental Impacts
Nuclear-fuel-cycle education: Module 10. Environmental consideration, 8: 43394 (R:US)
Radiation Hazards
Nuclear-fuel-cycle education: Module 10. Environmental consideration, 8: 43394 (R:US)

FUEL ELEMENT CLUSTERS
Heat Transfer
Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing, 8: 43803 (R:SU:In Russian)
High Temperature
High temperature measuring device, 8: 43954 (P:US)
Hydraulics
Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing, 8: 43803 (R:SU:In Russian)
Mass Transfer
Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing, 8: 43803 (R:SU:In Russian)
Performance Testing
Use of the URANUS code at Karlsruhe Nuclear Research Center (LMFBR), 8: 43926 (RA:DE:In German)
Pressure Drop
Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle, 8: 44422 (R:BR:In Portuguese)
Pressure Measurement
Experimental measurements of static pressure and pressure drop in a duct enclosing a seven wire-wrapped rod bundle, 8: 44422 (R:BR:In Portuguese)
Temperature Distribution
Impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle, 8: 43808 (R:DE)
Temperature Monitoring
Water level sensor and temperature profile detector, 8: 43866 (P:US)

FUEL ELEMENT FAILURE
UK MT-3 ballooning test in the Battelle NRU loop (PWR), 8: 43896 (R:GB)

FUEL ELEMENTS
See also ANNULAR FUEL ELEMENTS
FUEL PINS
FUEL PLATES
FUEL RODS
SPENT FUEL ELEMENTS
Design
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8: 43746 (R:US)
Radionuclide Migration
Migration behaviour of fission products in and from spherical HTR fuel elements (SAPHIR loop experiments in the PEGASE reactor), 8: 43848 (R:DE)
Swelling
Energy supply and the swelling in solid fuels, 8: 43865 (R:BR:In Portuguese)

FUEL FABRICATION PLANTS
Safeguards
End-crop box counter manual, 8: 43405 (R:US)
MC and A reform amendment: variance estimates and performance evaluation, 8: 43410 (R:US)
Scrap
End-crop box counter manual, 8: 43405 (R:US)

FUEL FEEDING SYSTEMS
Flowmeters
Project study of prototype plant for the VEW-coal-conversion-process (pressure operation), 8: 43147 (R:DE:In German)
Pressure Dependence
Project study of prototype plant for the VEW-coal-conversion-process (pressure operation), 8: 43147 (R:DE:In German)

FUEL GAS
See also INTERMEDIATE BTU GAS
LOW BTU GAS
NATURAL GAS
Chemical Composition
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
Retrofit of a package boiler to utilize producer gas, 8: 43730 (RA:US)
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
Desulfurization
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8: 43173 (R:US)
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8: 43163 (R:US)
Hot Gas Cleanup
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8: 43173 (R:US)
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8: 43163 (R:US)
Pressure Dependence
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
Production
Support research for biomass thermal-gasification development, 8: 43422 (R:US)
Temperature Dependence
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
FUEL INJECTION SYSTEMS
Computerized Simulation
Model for pneumatic pellet injection, 8: 45257 (R:US)
FUEL MANAGEMENT
Computer Calculations
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)
Cost Benefit Analysis
Comparative study of fuel management in PWR reactors, 8: 43775 (RA:BR:In Portuguese)
Educational Tools
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)
Mathematical Models
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)
FUEL OILS
See also RESIDUAL FUELS
Combustion
Analysis of alternative fuel price trajectories. Appendix B. Results of analysis of MFBI data using natural logarithms, 8: 43262 (R:US)
Specifications
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Sulfur Content
Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content, 8: 44173 (R:NO)
FUEL PELLETS
Fabrication
Fabrication of plutonium fuel for fast neutron reactors, 8: 43800 (R:FR:In French)
Fission Product Release
Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup (PWR; BWR), 8: 43747 (R:US)
Fuel Injection Systems
Model for pneumatic pellet injection, 8: 45257 (R:US)
Heat Transfer
Kalman filter-based gap conductance modeling (PWR; BWR), 8: 43748 (R:US)
FUEL PENCILS
See FUEL PINS
FUEL PINS
Heat Transfer
Investigations on the transient version of URANUS (LMFBR), 8: 43925 (RA:DE:In German)
Irradiation Procedures
Irradiation experiment Mol-7B, 8: 43809 (R:DE:In German)
Performance
Present state of the URANUS code (LMFBR), 8: 43811 (RA:DE:In German)
Performance Testing
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Physical Radiation Effects
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Testing
Post irradiation examination on test fuel pins for PWR, 8: 43770 (R:BR:In Portuguese)
Transients
Investigations by model theory of fast breeder reactor fuel pins and application to special safety experiments, 8: 43928 (R:DE:In German)
FUEL PLATES
Heat Transfer
Heat conduction in a plate-type fuel element with time-dependent boundary conditions, 8: 43864 (R:BR:In Portuguese)
FUEL REPROCESSING PLANTS
Environmental Impacts
Plutonium aerosols size distribution in a reprocessing plant, 8: 44700 (RA:DE)
FUEL RODS
Burnup
VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8: 43745 (R:US)
Destructive Testing
VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8: 43745 (R:US)
Extrusion
End-crop box counter manual, 8: 43405 (R:US)
Nondestructive Testing
VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8: 43745 (R:US)
Performance Testing
VNC hotcell examination of six high-exposure fuel rods from the Monticello power reactor, 8: 43745 (R:US)
Specifications
Neutronic calculation of the next fuel elements for the Argonaut reactor, 8: 43889 (RA:BR:In Portuguese)
FUEL SHEATHS
See FUEL CANS
FUEL SLUGS
See FUEL RODS
FUEL SLURRIES
Atomization
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
Chemical Preparation
Otisca T-Process: a new coal beneficiation approach for the preparation of coal slurries, 8: 43253 (RA:US)
Coal Preparation
Otisca T-Process: a new coal beneficiation approach for the preparation of coal slurries, 8: 43253 (RA:US)
Combustion
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
Combustion Properties
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)

Commercialization
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)
Demonstration Programs
Economic potential for cleaned coal water slurries: a utility perspective, 8: 43260 (RA:US)
Fuel Slurries
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)
Manufacturers
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)
Stabilization
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)

FUEL SUSPENSIONS
See FUEL SLURRIES

FUEL SYSTEMS
See also FUEL FEEDING SYSTEMS
FUEL INJECTION SYSTEMS
Corrosion Protection
Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends, 8: 44127 (R:US)

FUELS
See also AUTOMOTIVE FUELS
AVIATION FUELS
FUEL SLURRIES
JET ENGINE FUELS
LIQUID FUELS
NUCLEAR FUELS
SOLID FUELS
SYNTHETIC FUELS
THERMONUCLEAR FUELS
WOOD FUELS
Availability
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Chemical Composition
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Chemical Properties
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Cost
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Fuel quality/processing study. Volume IV. On-site processing studies, 8: 43177 (R:US)
Physical Properties
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Specifications
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Washing
Fuel quality/processing study. Volume IV. On-site processing studies, 8: 43177 (R:US)

FUELS (NUCLEAR)
See NUCLEAR FUELS

FUELWOOD
See WOOD FUELS

FUJAIRA
See UNITED ARAB EMIRATES

FUMES
See AEROSOLS

FUNGI
See also YEASTS
Growth
Growth of mold in fuel chips, 8: 43503 (R:SE:In Swedish)
Health Hazards
Occurrence of fungus spores in chip combustion and storage installations. II., 8: 43504 (R:NO:In Norwegian, English)

FURANS
Radiosensitivity Effects
Correlation of radiation sensitivity and nitrofurantoin sensitivity of Escherichia coli K-12, 8: 44796 (R:DE:In German)

FURNACES
See also OIL FURNACES
WOOD BURNING FURNACES
Computerized Control Systems
Minimizing the energy consumption of industrial furnaces during the heating process by controlling the furnaces using reliable mathematical models and by optimizing necessary cooled supports, 8: 44092 (R:DE:In German)
Energy Conservation
Minimizing the energy consumption of industrial furnaces during the heating process by controlling the furnaces using reliable mathematical models and by optimizing necessary cooled supports, 8: 44092 (R:DE:In German)
Energy Consumption
Industrial fuel applications. Furnaces and dryers, 8: 44099 (R:NL:In Dutch)

FUSED SALTS
See MOLTEN SALTS

FUSION FUELS
See THERMONUCLEAR FUELS

FUSION (NUCLEAR)
See THERMONUCLEAR REACTIONS

FUSION REACTORS
See THERMONUCLEAR REACTORS

FUSION (WELDING)
See WELDING

G

GADOLINIUM
Curie Point
Positron annihilation studies of phase transitions in ferromagnetic and antiferromagnetic crystals, 8: 44233 (BA:NL)
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
Muonic Atoms
Muonic x-ray measurement of the monopole and quadrupole charge parameters of /sup 154-158,160/Gd, 8: 45012 (J:US)

GADOLINIUM 147
Beta-Plus Decay
Nuclear structure of the low lying levels of ^{147}Eu from γ-γ directional correlation measurements on ^{147}Eu, 8: 45008 (J:US)

GADOLINIUM 155
Moessbauer Effect
Magnetism and crystalline electric fields in $R_2Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)

GADOLINIUM BORIDES
Superconductivity
Effect of superconductivity on spin dynamics in (Y/sub 1-x/R/sub x/)Rh_4B_4, 8: 44252 (J:US)

GADOLINIUM ISOTOPES
See also GADOLINIUM 147
GADOLINIUM 155
Charge Distribution
Muonic x-ray measurement of the monopole and quadrupole charge parameters of /sup 154-158,160/Gd, 8: 45012 (J:US)
Energy Levels
Muonic x-ray measurement of the monopole and quadrupole charge parameters of /sup 154-158,160/Gd, 8: 45012 (J:US)

GADOLINIUM SILICIDES
Crystal Field
Magnetism and crystalline electric fields in $R_2Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)
Magnetization
Magnetism and crystalline electric fields in $R_2Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)

GALAXY NUCLEI
Central part of galaxies.
Hydrodynamics
Bubbles, jets, and clouds in active galactic nuclei, 8: 44832 (J:US)

Jets
Bubbles, jets, and clouds in active galactic nuclei, 8: 44832 (J:US)
GALLIUM
Autoionization
Population of the three major exit channels in the 3d resonance region of atomic gallium, 8: 44895 (J:US)
Photoionization
Population of the three major exit channels in the 3d resonance region of atomic gallium, 8: 44895 (J:US)
GALLIUM 67
Biological Localization
Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8: 44767 (R:US)
Uptake
Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8: 44767 (R:US)
GALLIUM ARSENIDE SOLAR CELLS
Antireflection Coatings
AMOS solar cells on polycrystalline gallium arsenide. Final report, 8: 43500 (R:XE)
Electric Contacts
Simplified contacting scheme for GaAs solar cells using silver, 8: 43509 (R:US)
Fabrication
AMOS solar cells on polycrystalline gallium arsenide. Final report, 8: 43500 (R:XE)
Technology Assessment
Photovoltaic cell and module status, 8: 43498 (RA:US)
GALLIUM ARSENIDES
Energy Levels
Pressure induced conduction and valence band shifts in InP and GaAs from measurements at semiconductor—electrolyte interfaces, 8: 44297 (J:US)
Ion Implantation
Influence of oxygen on segregation of chromium at structural damage in gallium arsenide, 8: 44282 (R:US)
Radiation damage and implanted impurity distribution in GaAs on P ion implantation, 8: 44276 (RA:SU:In Russian)
Physical Radiation Effects
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
Quantum Efficiency
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
Refractivity
Refractive index of quaternary In/sub 1-x/Ga/sub x/As/sub y/P/sub 1-y/ lattice matched to InP, 8: 44300 (J:US)
Sputtering
AMOS solar cells on polycrystalline gallium arsenide. Final report, 8: 43500 (R:XE)
Superlattices
In/sub x/Ga/sub 1-x/As-In/sub y/Ga/sub 1-y/As strained-layer superlattices: A proposal for useful, new electronic materials, 8: 44259 (J:US)
Surface Properties
Distance dependence of electronic energy transfer to semiconductor surfaces: $^3n\pi$ /sup / pyrazine/GaAs(110), 8: 44306 (J:US)
Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8: 44144 (RA:SU:In Russian)
GALLIUM PHOSPHIDES
Refractivity
Refractive index of quaternary In/sub 1-x/Ga/sub x/As/sub y/P/sub 1-y/ lattice matched to InP, 8: 44300 (J:US)
Semiconductor Junctions
Intrinsic interface states as extended deep traps: Ge/GaP and Si/GaP, 8: 44291 (J:US)
Surface Properties
Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8: 44144 (RA:SU:In Russian)
GAMMA CAMERAS
Computerized Control Systems
Operation manual: mini-segmented gamma scanner, 8: 44618 (R:US)
Image Processing
Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8: 44767 (R:US)
GAMMA DETECTION
CDTE Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
HgI2 Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
X-radiation and soft gamma radiation detectors on the base of HgJ_2 crystals, 8: 44617 (RA:SU:In Russian)
Si Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
GAMMA SPECTRA
Spectra Unfolding
Method for unfolding high-energy scintillation gamma-ray spectra up to 8 MeV, 8: 45309 (R:DD:In German)
GAMMA SPECTROMETERS
See also PAIR SPECTROMETERS
Data Processing
Analysis of the data recorded from the intermediate gamma detector of the European hybrid spectrometer on the base of the statistical model of an electromagnetic shower, 8: 44572 (R:SU:In Russian)
GARRETT PROCESS
See OXY MODIFIED IN-SITU PROCESS
GAS COOLANTS
See GASES
GAS COOLED FAST BREEDER REACTORS
See GCFR TYPE REACTORS
GAS COOLED REACTORS
See also GCFR TYPE REACTORS
HTGR TYPE REACTORS
PEBBLE BED REACTORS
Coated Fuel Particles
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
Reactor Cores
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
Thermodynamic Cycles
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
GAS ENGINES
See INTERNAL COMBUSTION ENGINES
GAS FLOW
Simulation
Simulation of gas compressible flow by free surface water flow, 8: 44905 (R:BR:In Portuguese)
GAS HYDRATES
Enhanced Recovery
Conceptual models for gas hydrates. Phase I. Technical Directive 6. Final report (Steam injection; fracturing; decompression), 8: 43295 (R:US)
GAS INJECTION
Bench-Scale Experiments
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
Optimization
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
GAS LASERS
See also CARBON DIOXIDE LASERS
METAL VAPOR LASERS
Electric Discharges
Density and temperature variations in pulsed discharge lasers, 8: 44403 (J:US)

Electron Beam Pumping
Pulse compression by pulse-stacking in a KrF amplifier, 8: 44404 (J:US)
Pulse Techniques
Pulse compression by pulse-stacking in a KrF amplifier, 8: 44404 (J:US)
Temperature Measurement
Density and temperature variations in pulsed discharge lasers, 8: 44403 (J:US)

GAS SPILLS
Diffusion
Simulations and parameter-variation studies of heavy-gas dispersion using the SLAB model, 8: 44693 (R:US)
Mathematical Models
Prediction of hazard area resulting from a gas release, 8: 43294 (R:NO)
Plumes
Prediction of hazard area resulting from a gas release, 8: 43294 (R:NO)

GAS TURBINE ENGINES
Fuel Substitution
Development of wood as an alternative fuel for gas turbine systems, 8: 43472 (RA:US)

GAS TURBINES
Air Pollution Control
Fuel quality/processing study. Volume IV. On-site processing studies, 8: 43177 (R:US)
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Construction
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)
Design
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)
Exhaust Gases
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Fluidized-Bed Combustors
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)
Fuels
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Fuel quality/processing study. Volume IV. On-site processing studies, 8: 43177 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Testing
Engineer, design, construct, test and evaluate a pressurized fluidized-bed pilot plant using high-sulfur coal for production of electric power. Phase I. Preliminary engineering; Phase II. Pilot plant final design; Phase III. Construction. Quarterly report, June 1-August 31, 1979, 8: 44461 (R:US)

GASEOUS EFFLUENTS
See GASEOUS WASTES

GASEOUS WASTES
See also EXHAUST GASES
FLUE GAS
Catalytic Cracking
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
Combustion
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
Environmental Effects
Environmental effects of coal gasification, 8: 43263 (RA:US)
Pollution Control
Environmental control technology for gaseous emissions, 8: 43238 (RA:US)
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)

GASES
See also ELECTRON GAS and FERMI GAS.
See also EXHAUST GASES
FUEL GAS
SYNTHESIS GAS
Charged-Particle Transport
Detailed analysis of the scope of the modified Firsov model, 8: 45051 (J:US)
Desorption
Theory of bulk gettering, 8: 44296 (J:US)
Gettering
Theory of bulk gettering, 8: 44296 (J:US)

GASIFICATION
Any technique for converting coal or other products into gaseous fuel.
See also COAL GASIFICATION
IN-SITU GASIFICATION
Research Programs
Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary, 8: 43541 (R:US)

GASOHOL
Previous to August, 1979 this concept was indexed as gasoline AND mixtures AND ethanol or methanol.
Additives
Evaluation of fuel additives for reduction of material incompatibilities in methanol-gasoline blends, 8: 44127 (R:US)

GASOLINE
Prices
Petroleum marketing monthly, 8: 43285 (R:US)
Production
Catalytic conversion of fermentation derived ethanol to gasoline, 8: 43444 (J:US)
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
Slurry Fischer-Tropsch/Mobil two-stage process of converting syngas to high-octane gasoline. Quarterly report, 1 January-31 March 1981 (F-T/ZSM-5 process), 8: 43423 (R:US)
Sales
Petroleum marketing monthly, 8: 43285 (R:US)
Synthesis
Economic evaluation of indirect biomass liquefaction processes for production of methanol and gasoline, 8: 43456 (BA:US)

GASOLINE ENGINES
See INTERNAL COMBUSTION ENGINES

GCFR TYPE REACTORS
Thorium Cycle
Possible types of breeders with thorium cycle, 8: 43805 (RA:BR:In Portuguese)

GENERATORS (AEROSOL)
See AEROSOL GENERATORS

GENERATORS (ELECTRIC)
See ELECTRIC GENERATORS

GENERATORS (STEAM)
See STEAM GENERATORS

GEOLOGIC FORMATIONS
Natural Radioactivity
Background radioactivity from natural occurrences: a preliminary review, 8: 44717 (R:US)

GEORGIA
Textile Industry
Case study of a commercial small-scale wood-fueled steam boiler for textile mill operations, 8: 43474 (BA:US)

GEOTHERMAL ENERGY
Energy Source Development
FORSITE, a multiple-project management system: overview and general description, 8: 43653 (R:US)
Information Systems
Geothermal Progress Monitor: system status and operational experience, 8: 43659 (R:US)
Marketing Research
Consumer-behavorial analysis of alternate-energy adoption: the case of geothermal energy in New Mexico. Final report, 6/1/80-8/1/81, 8: 43661 (R:US)
Program Management
FORSITE, a multiple-project management system: overview and general description, 8: 43653 (R:US)
GEOTHERMAL EXPLORATION
Exploration for sources of geothermal energy.
Bibliographies
Compilation of geothermal information: exploration, 8: 43652 (R:US)
Program Management
FORSITE, a multiple-project management system: overview and general description, 8: 43653 (R:US)
GEOTHERMAL HEATING
Data Acquisition
Regional operations research program for commercialization of geothermal energy in the Rocky Mountain basin and range. Final technical report, January 1980-March 1981, 8: 43660 (R:US)
Marketing Research
Regional operations research program for commercialization of geothermal energy in the Rocky Mountain basin and range. Final technical report, January 1980-March 1981, 8: 43660 (R:US)
GEOTHERMAL INDUSTRY
Information Systems
Geothermal Progress Monitor: system status and operational experience, 8: 43659 (R:US)
GEOTHERMAL POWER PLANTS
Computer Codes
FORSITE, a multiple-project management system: production of critical-path development schedules for geothermal electric-power-generation projects, 8: 43663 (R:US)
Design
Raft River binary-cycle geothermal pilot power plant final report, 8: 43662 (R:US)
Performance
Raft River binary-cycle geothermal pilot power plant final report, 8: 43662 (R:US)
Program Management
FORSITE, a multiple-project management system: production of critical-path development schedules for geothermal electric-power-generation projects, 8: 43663 (R:US)
GEOTHERMAL RESOURCES
Bibliographies
Compilation of geothermal information: exploration, 8: 43652 (R:US)
GERMAN FEDERAL REPUBLIC
See FEDERAL REPUBLIC OF GERMANY
GERMAN FR ORGANIZATIONS
Research Programs
Institute in the year of 1981, 8: 44013 (R:DE:In German)
GERMANIUM
Crystal Defects
Radiation-induced defects in silicon and germanium. Secondary emission investigation method (1-10 keV ions of Na, Ar, Kr, Xe for Ge irradiation; 50-100 keV ions of B, N, O, P for Si irradiation), 8: 44271 (RA:SU:In Russian)
Electronic Structure
Atomic geometry and surface-state spectrum for Ge(111)-(2 x 1), 8: 44214 (J:US)
Interstitials
High-resolution photothermal ionization spectroscopy of lithium-related shallow donors in germanium, 8: 44215 (J:US)
Ion Implantation
Formation and rearrangement of radiation defects in ion implanted semiconductors (Na, P, B, As, Ar, H_2 ions of 40 to 50 keV range), 8: 44275 (RA:SU:In Russian)
Physical Radiation Effects
Formation and rearrangement of radiation defects in ion implanted semiconductors (Na, P, B, As, Ar, H_2 ions of 40 to 50 keV range), 8: 44275 (RA:SU:In Russian)
Radiation-induced defects in silicon and germanium. Secondary emission investigation method (1-10 keV ions of Na, Ar, Kr, Xe for Ge irradiation; 50-100 keV ions of B, N, O, P for Si irradiation), 8: 44271 (RA:SU:In Russian)
Semiconductor Junctions
Intrinsic interface states as extended deep traps: Ge/GaP and Si/GaP, 8: 44291 (J:US)
GERMANIUM COMPOUNDS
Charge Density
Physical content of electron-charge-density distributions in A15 compounds, 8: 44308 (J:US)
GERMANY (FEDERAL REPUBLIC)
See FEDERAL REPUBLIC OF GERMANY
GETTERING
Mathematical Models
Theory of bulk gettering, 8: 44296 (J:US)
GIANT RESONANCE
Spin Flip
Influence of nucleon internal degrees of freedom on the strength of electric giant resonances at low energies, 8: 45038 (J:US)
GINNA-1 REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
GLASS
See also BOROSILICATE GLASS
Line Widths
Theory of dephasing of impurities in glasses, 8: 44285 (R:US)
Microstructure
Dielectric surface structure change under ion irradiation (2-20 keV H_2i, D_2^+, He^+ ions), 8: 44268 (RA:SU:In Russian)
Physical Radiation Effects
Dielectric surface structure change under ion irradiation (2-20 keV H_2^+, D_2^+, He^+ ions), 8: 44268 (RA:SU:In Russian)
Structural Chemical Analysis
Microstructural characterization of simulated reactor waste forms, 8: 43381 (R:US)
GLASS INDUSTRY
Air Pollution
Inorganic-arsenic emissions from glass-manufacturing plants: background information for proposed standards, 8: 44755 (R:US)
GLASS SCINTILLATORS
Physical Radiation Effects
Study on the characteristics of lead-glass γ-spectrometer radiators irradiated by high energy particles, 8: 44625 (R:SU:In Russian)
GLUCOSE
Fermentation
Fermentation of cellulose and hemicellulose carbohydrates by thermotolerant yeasts, 8: 43459 (J:US)
Production of organic acids from biomass by acid hydrolysis and fermentation, 8: 43518 (J:US)
Shift in metabolism towards ethanol production in Saccharomyces cerevisiae by addition of metabolic inhibitors, 8: 43466 (J:US)
GLUCOSIDASE
Enzyme Activity
Characterization of β-1,4-glucosidase activity in Thermoanaerobacter ethanolicus, 8: 44783 (J:US)
GLUONS
Mass Formulae
Meson, baryon, and glueball masses in the MIT bag model, 8: 44943 (J:US)
Propagator
General infrared and ultraviolet troperties of the gluon propagator in the axial gauge, 8: 44939 (J:US)

GLYCERIN
See GLYCEROL
GLYCEROL
Neutron Dosimetry
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
GOBAR GAS
See INTERMEDIATE BTU GAS
METHANE
GOLD
Atom Collisions
Charge state of hydrogen backscattered from a gold monocrystal, 8: 44852 (RA:SU)
Auger Electron Spectroscopy
Persistent optical excitation to Rydberg states: Xe on Au, 8: 44210 (J:US)
Charged-Particle Transport
Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8: 45041 (RA:DE)
Sorptive Properties
Persistent optical excitation to Rydberg states: Xe on Au, 8: 44210 (J:US)
Sputtering
Atom collision processes in sputtering, 8: 44844 (RA:SU)
Investigation of the angular distributions of the sputtered atoms of gold monocrystals, 8: 44849 (RA:SU:In Russian)
Variation of spot intensity in monocrystal ejection patterns as a function of the ion incidence, 8: 44850 (RA:SU)
GOLD 197 TARGET
Alpha Reactions
Breakup of spectator residues in relativistic nuclear collisions, 8: 45020 (J:US)
Neon 20 Reactions
Breakup of spectator residues in relativistic nuclear collisions, 8: 45020 (J:US)
Proton Reactions
Breakup of spectator residues in relativistic nuclear collisions, 8: 45020 (J:US)
GONIOMETERS
Design
Goniometer attachment for low-speed diamond wafering saws, 8: 44395 (J:US)
GOVERNMENT POLICIES
See also ECONOMIC POLICY
ENERGY POLICY
ENVIRONMENTAL POLICY
Business criteria for coal gasification, 8: 43158 (RA:US)
Recommendations
Energy: everybody's business (USA), 8: 44031 (RA:US)
GRAIN ALCOHOL
See ETHANOL
GRAIN BOUNDARIES
Boundary Conditions
Boundary conditions at grain boundaries, 8: 45067 (J:US)
GRAINS (CEREAL)
See SEEDS
GRANITES
Boreholes
Water inflow into boreholes during the Stripa heater experiments, 8: 43362 (R:US)
Fracture Mechanics
Strain behavior of a granite and a graywacke sandstone in tension, 8: 44822 (J:US)
Hydraulic Conductivity
Field assessment of the use of borehole pressure transients to measure the permeability of fractured rock masses, 8: 43360 (R:US)
Hydraulic Fracturing
Determination of the state of stress at the Stripa Mine, Sweden, 8: 43363 (R:US)
Mineralogy
Petrology and radiogeology of the Stripa pluton, 8: 44817 (R:US)
Natural Radioactivity
Petrology and radiogeology of the Stripa pluton, 8: 44817 (R:US)
Permeability
Field assessment of the use of borehole pressure transients to measure the permeability of fractured rock masses, 8: 43360 (R:US)
Geohydrological data from the macropermeability experiment at Stripa, Sweden, 8: 44818 (R:US)
Petrology
Petrology and radiogeology of the Stripa pluton, 8: 44817 (R:US)
Strains
Strain behavior of a granite and a graywacke sandstone in tension, 8: 44822 (J:US)
Stress Analysis
Numerical modeling to assess possible influence of the mine openings on far-field in-situ stress measurements at Stripa, 8: 43361 (R:US)
GRANULAR BED FILTERS
Efficiency
Granular-bed-filter development program, Phase II. Final report, 8: 43212 (R:US)
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Mathematical Models
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Performance Testing
Granular-bed-filter development program, Phase II. Final report, 8: 43212 (R:US)
GRAPHITE
Corrosion
Corrosion and the corrosion inhibition effects in the BUGEY 1 reactor, 8: 43789 (R:FR:In French)
Crystal-Phase Transformations
Experimental phase diagram of lithium-intercalated graphite, 8: 44258 (J:US)
Phase Diagrams
Experimental phase diagram of lithium-intercalated graphite, 8: 44258 (J:US)
Physical Radiation Effects
Which atomic processes dominate plasma wall interaction, 8: 44152 (RA:SU)
GRAPHITE MODERATOR
See GRAPHITE
GRAPHS
Symmetry Groups
Symmetry groups of chemical graphs (Chemical graphs), 8: 44355 (J:US)
GRASS
Gasification
Support research for biomass thermal-gasification development, 8: 43422 (R:US)
GREENHOUSES
See also ATTACHED GREENHOUSES
Construction
Solar greenhouse retrofit on roof of five-story tenment (low-income sweat equity coop) in East Harlem, N.Y.C., 8: 43637 (RA:US)
Design
Passive solar greenhouse development, 8: 43626 (RA:US)
Energy Conservation
Evaluating of movable thermal screens with regard to the heat consumption of greenhouses, 8: 44083 (R:DE:In German)
Operation
Solar greenhouse retrofit on roof of five-story tenment (low-income sweat equity coop) in East Harlem, N.Y.C., 8: 43637 (RA:US)
GROUND MOTION
Risk Assessment
Determination of seismic reference motions on nuclear sites in France, 8: 43875 (R:FR:In French)

GROUND SOURCE HEAT PUMPS
Heat Exchangers
Rational energy utilization and utilization of solar energy in the open-air swimming pool and in the multiple purpose hall at Wiehl. Pt. F, 8: 44101 (R:DE:In German)
GROUND SUBSIDENCE
Measuring Methods
Head assembly for multiposition borehole extensometer, 8: 44651 (P:US)
GROUND WATER
Biological Effects
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
Chemical Analysis
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
Mathematical Models
Water system model development and applications within AEC and NASA laboratories, 8: 44724 (RA:US)
Radionuclide Migration
Characterization of radionuclide behavior in low level waste sites, 8: 43396 (J:US)
Ground-water surveillance at the Hanford Site for CY 1982, 8: 44748 (R:US)
Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides, 8: 43393 (R:US)
Sampling
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
Water Pollution
Effect of coal burning on contamination of regional resources of underground water, 8: 44738 (RA:DK)
Water Quality
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8: 43306 (R:US)
GROUND-WATER RESERVES
See AQUIFERS
GROUTING
Radionuclide Migration
Characterization of hydrofracture grouts for radionuclide migration, 8: 43374 (R:US)
GUINEA PIGS
Placenta
Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8: 44786 (R:US)
GULF OF ALASKA
Continental Shelf
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
Natural Gas Deposits
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
Petroleum Deposits
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
GYROTRONS
See MICROWAVE AMPLIFIERS

H

HADDAM NECK REACTOR
See CONNECTICUT YANKEE REACTOR
HADRON REACTIONS
Scattering
Conventional approach to the problem of the deuteron smearing corrections, 8: 44970 (J:US)
HAFNIUM 172
Radiochemistry
Generator production of ^{172}Lu from ^{172}Hf for limited nuclear medicine research, 8: 44366 (J:CH)
HALDEN HEAVY BOILING WATER REACTOR
See HBWR REACTOR
HALL GENERATORS
See MHD GENERATORS
HALOGENATED AROMATIC HYDROCARBONS
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
HANDLING (DATA)
See DATA PROCESSING
HANDLING (WASTES)
See WASTE MANAGEMENT
HANFORD RESERVATION
Radioactive Waste Disposal
Performance allocation traceable to regulatory criteria as applied to site-characterization work at the Basalt Waste Isolation Project, 8: 43378 (R:US)
HARD COAL
See BLACK COAL
HB ROBINSON-2
See ROBINSON-2 REACTOR
HBWR REACTOR
Neutron Detection
Non-destructive technique for qualitative and attribute verification of spent fuel elements. Final report for the period 1 May 1980 - 31 July 1982, 8: 43794 (R:XA)
Spent Fuel Elements
Non-destructive technique for qualitative and attribute verification of spent fuel elements. Final report for the period 1 May 1980 - 31 July 1982, 8: 43794 (R:XA)
HCDA
See REACTOR CORE DISRUPTION
H-COAL PROCESS
Environmental Impacts
Potential ecological hazards of H-Coal liquefaction, 8: 43222 (R:US)
HD 8077
See NICKEL BASE ALLOYS
HDO
See HEAVY WATER
HEALTH PHYSICS
See RADIATION PROTECTION
HEART
Biomedical Radiography
Right and left ventricular ejection fraction at rest and during exercise assessed with radionuclide angiocardiography, 8: 44772 (R:SE:In Swedish)
HEAT DISSIPATION
See DIFFUSION
ENVIRONMENTAL TRANSPORT
HEAT TRANSFER
THERMAL EFFLUENTS
HEAT ENGINES
See also INTERNAL COMBUSTION ENGINES
STIRLING ENGINES
Acoustics
Intrinsically irreversible thermoacoustic heat engine, 8: 44436 (J:US)
Dissipation Factor
Optimization of a heat engine based on a dissipative system, 8: 45083 (J:US)
Irreversible Processes
Intrinsically irreversible thermoacoustic heat engine, 8: 44436 (J:US)
Mathematical Models
Optimization of a heat engine based on a dissipative system, 8: 45083 (J:US)

Optimization
Optimization of a heat engine based on a dissipative system, 8: 45083 (J:US)

HEAT EXCHANGERS
Design
Design of heat exchangers by numerical methods, 8: 44417 (R:BR:In Portuguese)
Fouling
Biomass fueled Stirling engine combustor research, 8: 43473 (RA:US)
Evaluation of the low-temperature heat-exchanger fouling problem. Phase I report. Literature review and work plan, 8: 44061 (R:US)
Heat Transfer
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 2. Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8: 44432 (R:US)
New method to calculate pressure drop and shell-side heat transfer coefficient in a shell-and-tube heat exchanger, 8: 44420 (R:BR:In Portuguese)
Transfer coefficients for plate fin and elliptical tube heat exchangers, 8: 44412 (R:BR)
Hydraulics
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Liquid Metals
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Mass Transfer
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 2. Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8: 44432 (R:US)
Transfer coefficients for plate fin and elliptical tube heat exchangers, 8: 44412 (R:BR)
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Natural Convection
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Performance Testing
Investigation of combined heat and mass transfer from a wet heat exchanger. Part 2. Experimental results and operational characteristics of heat exchangers in dry/wet operations, 8: 44432 (R:US)
Pressure Drop
New method to calculate pressure drop and shell-side heat transfer coefficient in a shell-and-tube heat exchanger, 8: 44420 (R:BR:In Portuguese)
Specifications
Design concept for vessels and heat exchangers, 8: 44383 (R:BR)
Tubes
Leakage-flow-induced vibration of a tube-in-tube slip joint (LMFBR), 8: 43799 (R:US)

HEAT PIPES
Efficiency
Heat pipe - a heat conductor of high efficiency, 8: 44435 (R:DD:In German)
Optimization
Experimental analytical study on heat pipes, 8: 44382 (R:BR:In Portuguese)
Thermal Analysis
Experimental analytical study on heat pipes, 8: 44382 (R:BR:In Portuguese)
Uses
Heat pipe - a heat conductor of high efficiency, 8: 44435 (R:DD:In German)

HEAT RECOVERY EQUIPMENT
Working Fluids
Analysis and reduction of degradation of working fluid in the Sundstrand Organic Rankine-Cycle System, 8: 44097 (R:US)

HEAT STORAGE
See also LATENT HEAT STORAGE
Research Programs
United States Department of Energy thermal energy storage program, 8: 43976 (BA:NL)

HEAT STORAGE DEVICES
See THERMAL ENERGY STORAGE EQUIPMENT

HEAT STORAGE SYSTEMS
See THERMAL ENERGY STORAGE EQUIPMENT

HEAT TRANSFER
Mathematical Models
Applications of alternating direction methods to the solution of the heat conduction equation, with source, and in transient state, 8: 44427 (R:BR:In Portuguese)
Transients
Calculation of two-dimensional thermal transients by the finite element method, 8: 44426 (R:BR:In Portuguese)

HEAT TRANSMISSION
See HEAT TRANSFER

HEATED EFFLUENTS
See THERMAL EFFLUENTS

HEATING SYSTEMS
See also SOLAR HEATING SYSTEMS
Energy Conservation
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors, 8: 44025 (R:DE:In German)

HEAVY FUELS
See RESIDUAL FUELS

HEAVY ION ACCELERATORS
Includes combined accelerator types for heavy ion acceleration.
Beam Transport
Final beam transport in the reactor chamber, 8: 45239 (RA:JP)
Meetings
Proceedings of the symposium on accelerator aspects of heavy ion fusion, 8: 44468 (R:DE)
Thermonuclear Reactions
Final beam transport in the reactor chamber, 8: 45239 (RA:JP)

HEAVY ION REACTIONS
See also ARGON 40 REACTIONS
CARBON 12 REACTIONS
IRON 56 REACTIONS
NEON 20 REACTIONS
OXYGEN 16 REACTIONS
SULFUR 32 REACTIONS
Breakup Reactions
Aspects of data on the breakup of highly excited nuclei, 8: 44931 (R:US)
Hydrodynamic Model
Hydrodynamics and relativistic heavy-ion collisions, 8: 44930 (R:US)
Inelastic Scattering
Comparison of the semiclassical coupled channel theory of particle transfer with exact calculations, 8: 45037 (J:US)
Research Programs
German HIF program, 8: 44967 (RA:DE)
U.K. programme in heavy ion fusion, 8: 44965 (RA:DE)
U.S. program in heavy-ion fusion, 8: 44964 (RA:DE)
Reviews
Present status of heavy-ion fusion study in Japan, 8: 44966 (RA:DE)
Transfer Reactions
Comparison of the semiclassical coupled channel theory of particle transfer with exact calculations, 8: 45037 (J:US)

HEAVY ION SPECTROMETERS
Data Acquisition Systems
LULU analysis program, 8: 44553 (R:US)

HEAVY LEPTONS
Search for new heavy leptons at PETRA, 8: 44918 (R:DE)

HEAVY LIQUID BUBBLE CHAMBERS
Image Processing
Program controlled system for mathematical processing the αp-experiment data, 8: 44603 (R:SU:In Russian)

HEAVY OILS
See PETROLEUM

HEAVY WATER
Monitoring
Tritiated-water detection with a $^{2}D(\gamma,n)^{1}H$ monitor, 8: 44569 (R:US)
HEAVY WATER COOLANT
See HEAVY WATER
HEAVY WATER MODERATED REACTORS
See also CANDU TYPE REACTORS
Kernels
Calculation of the Kernel scattering for thermal neutrons in H_2O and D_2O, 8: 43795 (RA:BR:In Portuguese)
Reactor Kinetics
Calculation of the Kernel scattering for thermal neutrons in H_2O and D_2O, 8: 43795 (RA:BR:In Portuguese)
HEAVY WATER MODERATOR
See HEAVY WATER
HELIOTRON
Vacuum Systems
Vacuum system of the Heliotron E high temperature plasma system, 8: 45250 (RA:JP:In Japanese)
HELIUM
Charged-Particle Transport
Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8: 44899 (J:US)
Energy Levels
Helium population model, 8: 45136 (RA:CS)
Two-Phase Flow
Hydrodynamic characteristics of a horizontal channel on the helium two-phase flow motion, 8: 44428 (R:SU:In Russian)
HELIUM 3 REACTIONS
Stripping
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
HELIUM 3 TARGET
Photonuclear Reactions
Threshold pion photoproduction from the trinucleon, 8: 44947 (J:NL)
HELIUM 4
See also HELIUM II
Giant Resonance
Isospin mixing in the ^{4}He giant dipole resonance, 8: 44971 (J:US)
HELIUM 4 REACTIONS
See ALPHA REACTIONS
HELIUM 4 TARGET
Photonuclear Reactions
Isospin mixing in the ^{4}He giant dipole resonance, 8: 44971 (J:US)
Proton Reactions
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
HELIUM 8
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
HELIUM COMPOUNDS
Electronic Structure
Electronic structure of H/sub n/$^{+}$ and HeH/sub n/$^{+}$ clusters, 8: 44341 (J:US)
HELIUM II
The phase of liquid helium-4 which is stable at temperatures between absolute zero and the lambda point (about 2.2 K).
Heat Flow
Heat flow in a He II-filled fin, 8: 44434 (R:US)
HELIUM IONS
Backscattering
Energy spectra and charge states for H and He backscattered from Si in the energy range of 1.5-10 keV, 8: 44853 (RA:SU)
Surface scattering of MeV He^{+} ions from W(100) and Si(100) monocrystals, 8: 44856 (RA:SU)
Collisions
Electron emission from metal-film systems under atomic particle bombardment, 8: 44871 (RA:SU:In Russian)
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
Ion-Atom Collisions
Cross section of elastic scattering of ions on atoms, 8: 44843 (RA:SU)
Ionization
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
HEMICELLULOSE
See also XYLANS
Acid Hydrolysis
Fermentation of wheat straw hemicelluloses to ethanol by Pachysolen tannophilus, 8: 43458 (J:US)
HEPTANE
Combustion
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)
HETEROGENEOUS REACTOR CORES
Performance
Method for calculating the lifetime of a heterogeneous reactor with regular lattice of reactor control system elements, 8: 43850 (R:SU:In Russian)
HEXANE
Combustion
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)
HEXENES
Combustion
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)
HGI2 SEMICONDUCTOR DETECTORS
Crystal Growth
X-radiation and soft gamma radiation detectors on the base of HgJ_2 crystals, 8: 44617 (RA:SU:In Russian)
Energy Resolution
X-radiation and soft gamma radiation detectors on the base of HgJ_2 crystals, 8: 44617 (RA:SU:In Russian)
HIGGS BOSONS
Decay
Decay of the Higgs boson into heavy-quarkonium states, 8: 44937 (J:US)
HIGH ENERGY PHYSICS
Use only for articles of a very broad nature such as an annual research program, etc.
Research Programs
Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary, 8: 43541 (R:US)
Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983 (Brandeis University), 8: 44911 (R:US)
HIGH ENERGY RADIOTHERAPY
See RADIOTHERAPY
HIGH TEMPERATURE
Measuring Instruments
High temperature measuring device, 8: 43954 (P:US)
HIGH TEMPERATURE GAS COOLED AND GRAPHITE
See HTGR TYPE REACTORS
HIGH VOLTAGE ALTERNATING CURRENT SYSTEMS
See HVAC SYSTEMS
HIGH-FREQUENCY HEATING
See also ECR HEATING
ICR HEATING
LOWER HYBRID HEATING
Plasma Density
Generalization of barometric formula for a sollisional plasma in a magnetostatic and rf fields, 8: 45134 (RA:CS)
HIGH-LEVEL RADIOACTIVE WASTES
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
HIGH-PURITY GE DETECTORS
Fabrication
Coaxial detectors from superpure germanium, 8: 44596 (R:SU:In Russian)
HIGH-VOLTAGE PULSE GENERATORS
8-stage, 23-kJ, 1-MV Marx generator, 8: 45247 (RA:CS)
Thyratrons
Small and light thyratron grid driver, 8: 44455 (R:US)
HIGHWAYS
See ROADS

HISTORICAL ASPECTS
Reviews
History of the Atomic Energy Commission, 8: 43743 (R:US)
HODOSCOPES
Data Acquisition
Problems of optimal data coding in hodoscopic systems, 8: 44606 (R:SU:In Russian)
Spatial Resolution
Study on the coordinate precision of hodoscope hadron calorimeter at energies up to 300 GeV, 8: 44571 (R:SU:In Russian)
HOG FUEL
See WOOD WASTES
HOLMIUM BORIDES
Magnetic Properties
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8: 44242 (R:US)
Superconductivity
Investigation of the occurrence of superconductivity below the antiferromagnetic transition in Ho(Ir/sub 0.7/Rh/sub 0.3/)$_4$B$_4$, 8: 44249 (J:US)
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8: 44242 (R:US)
HOMOGENEOUS REACTORS
Reactor Cores
Technique and computer code for calculating the isotope composition change in one-dimensional homogeneous reactor, 8: 43839 (R:SU:In Russian)
HORDEUM
See BARLEY
HOT GAS CLEANUP
Adsorbents
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8: 43173 (R:US)
Granular Bed Filters
Granular-bed-filter development program, Phase II. Final report, 8: 43212 (R:US)
Mathematical Models
Hot-gas cleanup system model development: status report (Electrostatic precipitators, ceramic cross-flow filters, and granular bed filters), 8: 43216 (R:US)
Research Programs
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8: 43173 (R:US)
HOT PLASMA
Impurities
Electron impact ionization of highly charged molybdenum impurities in tokamak plasmas, 8: 45119 (RA:CS)
Mesons
Meson emissions from quark-gluon plasma through formation and fission of chromoelectric flux tubes, 8: 44932 (R:US)
HOT-DRY-ROCK SYSTEMS
Seismic Surveys
Changes in compressional and shear wave velocities and dynamic moduli during operation of a hot dry rock geothermal system, 8: 43655 (J:US)
HOUSEHOLDS
Energy Conservation
Energy conservation in households: attitudes, requirements and behavior, a national investigation, 8: 44117 (R:NL:In Dutch)
Energy Consumption
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households, 8: 44115 (R:NL:In Dutch)
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households. Summary, 8: 44116 (R:NL:In Dutch)
HOUSES
Air Infiltration
Controlled ventilation with heat recovery for residential buildings, 8: 44067 (R:DE:In German)
Attached Greenhouses
Libertytown solar demonstration home, 8: 43576 (RA:US)
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
Passive and hybrid solar heating for manufactured housing, 8: 43566 (RA:US)
Performance analysis of a solar attached greenhouse near Three-Mile Island using fuel bill data, 8: 43584 (RA:US)
Direct Gain Systems
Design and performance of a cycle five house: a review, 8: 43578 (RA:US)
Development of the independence series bringing passive solar to the real world, 8: 43559 (RA:US)
Libertytown solar demonstration home, 8: 43576 (RA:US)
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
Passive and hybrid solar heating for manufactured housing, 8: 43566 (RA:US)
Energy Audits
Evaluation of the home-energy-rating concept and the Massachusetts Pilot Project, 8: 44086 (R:US)
Technical issues for building energy ratings, 8: 44081 (R:US)
Energy Conservation
Design and performance of a cycle five house: a review, 8: 43578 (RA:US)
Main characteristics of housing permitting reduced energy consumption for heating. Final report, 8: 44079 (R:XE)
Energy Efficiency
Evaluation of the home-energy-rating concept and the Massachusetts Pilot Project, 8: 44086 (R:US)
Heat Recovery
Controlled ventilation with heat recovery for residential buildings, 8: 44067 (R:DE:In German)
Passive Solar Cooling Systems
Passive solar home, Houston, 8: 43577 (RA:US)
Passive Solar Heating Systems
Denver Metro Home Builders Program, 8: 43558 (RA:US)
Design and construction of three manufactured passive solar homes: a field test, 8: 43563 (RA:US)
Impact of controls in passive solar heating of buildings, 8: 43567 (RA:US)
Iowa-project passive: a passive solar house design being built by selected Iowa Community College building trade programs, 8: 43586 (RA:US)
Marin Solar Village, 8: 44107 (RA:US)
Passive and hybrid solar manufactured housing and buildings. Phase I, 8: 43565 (RA:US)
Passive solar home, Houston, 8: 43577 (RA:US)
Pfister residence - results of a passive retrofit in a cold climate, 8: 43580 (RA:US)
Qualitative approach to performance evaluation of passive solar residences, 8: 43587 (RA:US)
Residential passive solar development and marketing, 8: 43624 (RA:US)
Roof Ponds
Performance evaluation of a passively heated and cooled solar house, 8: 43616 (RA:US)
Thermal Insulation
Passive and hybrid solar manufactured housing and buildings. Phase I, 8: 43565 (RA:US)
Trombe Walls
Libertytown solar demonstration home, 8: 43576 (RA:US)
HTGR TYPE REACTORS
After-Heat Removal
Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors, 8: 43791 (R:DE:In German)
Economics
60-MW/sub t/ methanation plant design for HTGR process heat, 8: 43833 (R:US)

Fuel Elements
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8: 43746 (R:US)
Fuel Management
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)
Loss of Coolant
Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500, 8: 43922 (R:DE:In German)
Methanation
60-MW/sub t/ methanation plant design for HTGR process heat, 8: 43833 (R:US)
Reactor Kinetics
Preparation of the constant library in the NEKTAR-M program using the files of evaluated neutron data, 8: 43790 (R:SU:In Russian)
Reactor Safety
Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8: 43909 (R:US)
Reactor Sites
Reactor siting risk comparisons related to recommendations of NUREG-0625, 8: 43879 (BA:US)
Risk Assessment
Accident consequences and risk assessments based on the probabilistic safety study of a nuclear power plant with a high temperature reactor (HTR-1160), 8: 43927 (R:DE:In German)
Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8: 43909 (R:US)
Scram
Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors, 8: 43791 (R:DE:In German)
Specifications
60-MW/sub t/ methanation plant design for HTGR process heat, 8: 43833 (R:US)

HTO
See HEAVY WATER

HUGENHOLTZ-PINES THEORY
See HYDROGEN

HUMAN CELLS
See ANIMAL CELLS

HUMAN POPULATIONS
Behavior
Energy conservation, how is it possible. A social-psychological research of the promotion of energy conservation by influencing the behavior of households, 8: 44115 (R:NL:In Dutch)
The social network approach to increase energy conservation: theoretical backgrounds, 8: 44118 (R:NL:In Dutch)
Radiation Doses
Generic evaluation of the radiological impacts of transportation in the nuclear fuel cycle, 8: 43334 (R:US)
Radiation burden in dwelling-houses by radon and its daughter elements, 8: 44698 (RA:AT:In German)
The benchmarking of RADTRAN II, 8: 43335 (R:US)
Truck transportation of radioactive materials, 8: 43336 (R:US)
Radiation Hazards
Generic evaluation of the radiological impacts of transportation in the nuclear fuel cycle, 8: 43334 (R:US)

HUMANS
See HUMAN POPULATIONS

HVAC SYSTEMS
For heating, ventilating, and air conditioning systems, see SPACE HVAC SYSTEMS.
Failure Mode Analysis
Potentially damaging failure modes of high- and medium-voltage electrical equipment, 8: 44452 (R:US)

HYBRID REACTORS
Breeding Blankets
US-DOE Fusion-Breeder Program: blanket design and system performance, 8: 45263 (R:US)
Feasibility Studies
Global model of a hybrid tokamak reactor with an auxiliary rf heating, 8: 45248 (RA:CS)

HYDRAULIC TRANSPORT
Correlations
Experimental investigation of interfacial shear in large-particle-coal hydrotransport, 8: 43255 (R:US)

HYDROBROMIC ACID
Atom-Molecule Collisions
CARS investigation of HBr and H_2 collisions with hot H atoms produced by ArF laser photolysis of HBr, 8: 44883 (J:US)

HYDROCARBONS
See also ANTHRACENE
BENZENE
NAPHTHALENE
PHENANTHRENE
POLYCYCLIC AROMATIC HYDROCARBONS
STYRENE
TOLUENE
Biosynthesis
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
Electron Mobility
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8: 44359 (R:US)
Radiolysis
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8: 44359 (R:US)

HYDROCYANIC ACID
Hydrolysis
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)

HYDROELECTRIC POWER PLANTS
See also SMALL-SCALE HYDROELECTRIC POWER PLANTS
Demonstration Programs
Small-Scale Hydroelectric Power Demonstration Project: Turlock Irrigation District Drop No. 1 power plant. Final technical and construction cost report, 8: 43475 (R:US)

HYDROGEN
Adsorption
Magnesium hydride for load-leveling energy storage. Final report, 8: 43420 (R:XE)
Atom-Molecule Collisions
CARS investigation of HBr and H_2 collisions with hot H atoms produced by ArF laser photolysis of HBr, 8: 44883 (J:US)
Backscattering
Charge state of hydrogen backscattered from a gold monocrystal, 8: 44852 (RA:SU)
Balmer Lines
Formation of excited H by impact of H_1^+, H_2^+, H_3^+ ions on metal surfaces, 8: 44145 (RA:SU)
Charged-Particle Transport
Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8: 44899 (J:US)
Consumption Rates
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Desorption
Magnesium hydride for load-leveling energy storage. Final report, 8: 43420 (R:XE)
Electron Probes
Some future directions for metal hydride surface studies: electrons as probes of hydrogen, 8: 44255 (J:CH)
Energy Levels
Theoretical study of the lowest $^1\Sigma$/sub g/$^+$ doubly excited state of H_2, 8: 44897 (J:US)
Group Constants
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8: 43842 (R:XA)

Ion Collisions
Coherent Stark levels in beam-foil—excited fast Rydberg atoms, 8: 44900 (J:US)
Ionization
Coherent Stark levels in beam-foil—excited fast Rydberg atoms, 8: 44900 (J:US)
Metallurgical Effects
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Molecular Structure
Theoretical study of the lowest $^1\Sigma$/sub g/$^+$ doubly excited state of H_2, 8: 44897 (J:US)
Raman Effect
Transient effects and pump depletion in stimulated Raman scattering (Para-hydrogen), 8: 44399 (R:US)
Rydberg States
Coherent Stark levels in beam-foil—excited fast Rydberg atoms, 8: 44900 (J:US)
Solubility
Influence of hydrogen on pure iron and steel at medium and high pressure levels, 8: 44174 (R:DE:In German)

HYDROGEN 1 MINUS BEAMS
Beam Production
Ring-magnetron ionizer for polarized negative-ion sources, 8: 44511 (R:US)

HYDROGEN 2
See DEUTERIUM

HYDROGEN 3
See TRITIUM

HYDROGEN BROMIDES
See HYDROBROMIC ACID

HYDROGEN COMPOUNDS
See also HYDROGEN SULFIDES
WATER
Electronic Structure
Electronic structure of H/sub n/$^+$ and HeH/sub n/$^+$ clusters, 8: 44341 (J:US)

HYDROGEN CYANIDES
See HYDROCYANIC ACID

HYDROGEN HYDROXIDES
See WATER

HYDROGEN IONS
See also HYDROGEN IONS 1 PLUS
Backscattering
Energy spectra and charge states for H and He backscattered from Si in the energy range of 1.5-10 keV, 8: 44853 (RA:SU)
Collisions
Energy and charge distributions in scattered particle flux under 5-60 keV hydrogen ion bombardment of copper target, 8: 44855 (RA:SU:In Russian)
Ion Sources
High-concentration H_3i or D_3^+ ion source, 8: 44889 (J:US)

HYDROGEN IONS 1 PLUS
For H_1^+ ions.
Reflection
Influence of stopping power on the reflection coefficients of hydrogen ions from stainless steel, 8: 44861 (RA:SU)

HYDROGEN MINUS 1 BEAMS
See HYDROGEN 1 MINUS BEAMS

HYDROGEN NITRATES
See NITRIC ACID

HYDROGEN PRODUCTION
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Biophotolysis
Application of intact algae to the biophotolysis, 8: 43419 (J:US)
Seawater-based hydrogen production by immobilized marine photosynthetic bacteria, 8: 43418 (J:US)
Electrolysis
Electrochemical oxygenation of livestock wastes, 8: 43525 (J:US)

HYDROGEN STORAGE
Magnesium Hydrides
Magnesium hydride for load-leveling energy storage. Final report, 8: 43420 (R:XE)

HYDROGEN SULFATES
See SULFURIC ACID

HYDROGEN SULFIDES
Adsorption
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Bioconversion
Acid-gas bioconversion favors sulfur production, 8: 44781 (J:US)
Chemical Reactions
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8: 43163 (R:US)
Removal
Study of the mechanism of the hydrogen sulfide/dolomite reaction. Final report for the period July 1976-December 1979, 8: 43163 (R:US)

HYDROGENATION
Catalysts
Coal liquefaction technology development in NEDO, 8: 43156 (RA:US)
First experiences and results of the 200 T/D pilot plant Bottrop, 8: 43155 (RA:US)

HYDROLOGY
Mathematical Models
Environmental modeling of hydrologic systems, 8: 44752 (RA:US)
Systems Analysis
Environmental modeling of hydrologic systems, 8: 44752 (RA:US)

HYDROXY COMPOUNDS
For organic compounds only and excluding SACCHARIDES, GLYCOSIDES and HYDROXY ACIDS.
See also ALCOHOLS
PHENOLS
Radiolysis
Geometric model of trapped electrons in x-ray irradiated single crystals of rhamnose, 8: 44361 (J:US)
Trapped Electrons
Geometric model of trapped electrons in x-ray irradiated single crystals of rhamnose, 8: 44361 (J:US)

HYDROXYBENZENE
See PHENOL

HYDROXYPROPIONIC ACID-ALPHA
See LACTIC ACID

HYPERFRAGMENTS
See HYPERNUCLEI

HYPERNUCLEI
Binding Energy
Binding energy estimates for charmed few-body systems, 8: 44938 (J:US)
Production
Σ Hypernuclei, 8: 44926 (J:US)

HYPERTHERMIA
Radiosensitivity Effects
Influence of hyperthermia on the biological effects of low LET-radiation with different energy spectra, 8: 44794 (R:DE:In German)

HYPOPHOSPHITES
See HYPOPHOSPHOROUS ACID

HYPOPHOSPHOROUS ACID
Iodometry
Quantitative determination of phosphorous and hypophosphorous acid, 8: 44333 (TJ:US)

I

IAEA SAFEGUARDS
International non-proliferation regime. An historical overview, 8: 43403 (RA:CA)

IBR-2 REACTOR
Data Acquisition Systems
Software for the SONET computer network intended for automation of scientific experiments, 8: 43891 (R:SU:In Russian)
IBR-30 REACTOR
Data Acquisition Systems
Software for the SONET computer network intended for automation of scientific experiments, 8: 43891 (R:SU:In Russian)
ICR HEATING
Antennas
Ridge waveguide aperture antenna, 8: 45197 (B:FR:In French)
Monte Carlo Method
Monte Carlo studies of tandem-mirror plasmas interacting with waves in the ion-cyclotron range of frequencies (ICRF). Progress report, April 1, 1983-June 30, 1983, 8: 45099 (R:US)
IDAHO ADVANCED TEST REACTOR
See ATR REACTOR
IDAHO NATIONAL ENGINEERING LABORATORY
Prior to 1976 known as NRTS and older material is so indexed.
Industrial Wastes
Industrial-waste-management information for 1982 and record-to-date, 8: 44707 (R:US)
Radioactive Waste Facilities
Summary of INEL waste reduction/treatment facilities: SWEPP, PREPP, WERF, 8: 43352 (R:US)
Rodents
Ecological characteristics of small mammals on a radioactive waste disposal area in southeastern Idaho, 8: 43397 (J:US)
IEAR-1 REACTOR
Research Programs
Experience and research with the IEA-R1 Brazilian reactor, 8: 43890 (R:BR)
IMAGE INTENSIFIERS
Gating Circuits
Optical shutters using microchannel plate (MCP) intensifier tubes, 8: 44645 (R:US)
IMAGE PROCESSING
Coded aperture imaging with self-supporting uniformly redundant arrays, 8: 44649 (P:US)
IMAGES
Image Processing
Background pattern removal by power spectral filtering, 8: 45090 (J:US)
Optical Scanners
Improved system for measuring the writing speed of sweeping image cameras, 8: 44457 (J:US)
Pattern Recognition
Background pattern removal by power spectral filtering, 8: 45090 (J:US)
IMMOBILIZED CELLS
Leaks
Maximizing microbial cell loading in immobilized-cell systems, 8: 43462 (J:US)
Performance
Maximizing microbial cell loading in immobilized-cell systems, 8: 43462 (J:US)
Productivity
Seawater-based hydrogen production by immobilized marine photosynthetic bacteria, 8: 43418 (J:US)
Sample Preparation
Continuous fermentation: improvement of cell immobilization by zeta potential measurement, 8: 44784 (J:US)
IMPACT FUSION
Achieved by the acceleration of a DT-bearing projectile and subsequent impact with a stationary target or a similiarly accelerated projectile.
Colliding Beams
Fusion at counterstreaming ion beams - ion optic fusion (IOF), 8: 45244 (RA:CS)
IMPERMEABLE DRY ROCK
See HOT-DRY-ROCK SYSTEMS
IMPLANTED SOURCES
See RADIATION SOURCE IMPLANTS
IMPURITIES
Unwanted constituents, not for TRACE AMOUNTS, INTERFERING ELEMENTS, or metal and nonmetal additions.
Nuclear Magnetic Resonance
Concentration dependence of relaxation by dipole impurities, 8: 45071 (J:US)
Relaxation
Concentration dependence of relaxation by dipole impurities, 8: 45071 (J:US)
INCINERATION
See COMBUSTION
INCOMPRESSIBLE FLOW
Forced Convection
Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above, 8: 44424 (R:BR)
Mathematical Models
Mathematical model for the calculation of internal turbulent flow, 8: 44906 (R:BR:In Portuguese)
Natural Convection
Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above, 8: 44424 (R:BR)
Navier-Stokes Equations
Number of modes governing two-dimensional viscous, incompressible flows, 8: 44910 (J:US)
Numerical Solution
A nodal integral method for the numerical solution of incompressible fluid flow problems, 8: 45280 (J:US)
INCONEL 600
Crack Propagation
Role of uncertainty in the measurement of crack length by compliance techniques, 8: 44177 (RA:US)
Intergranular Corrosion
Intergranular attack of Alloy 600: high-temperature electrochemical tests. Final report, 8: 44137 (R:FR)
INCONEL ALLOYS
See also INCONEL 600
INCONEL X750
Crack Propagation
Effects of PWR environment on the fatigue crack growth of different stainless steels and inconel type alloy, 8: 43783 (RA:US)
INCONEL X750
Crack Propagation
Role of uncertainty in the measurement of crack length by compliance techniques, 8: 44177 (RA:US)
IN-CORE FUEL MANAGEMENT
See FUEL MANAGEMENT
INDIA
Coal Gasification Plants
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Environmental Policy
Applications of nuclear and applied techniques in public health and pollution control. Proceedings, 8: 44005 (R:IN)
Fossil-Fuel Power Plants
Ash disposal at super thermal power stations in India, 8: 43204 (RA:DK)
Technology Utilization
Applications of nuclear and applied techniques in public health and pollution control. Proceedings, 8: 44005 (R:IN)
INDIUM 103
Beta-Plus Decay
Beta-decay energies and masses of $^{103-105}$In, 8: 45006 (J:US)
Mass Defect
Beta-decay energies and masses of $^{103-105}$In, 8: 45006 (J:US)
INDIUM 105
Beta-Plus Decay
Beta-decay energies and masses of $^{103-105}$In, 8: 45006 (J:US)
Mass Defect
Beta-decay energies and masses of $^{103-105}$In, 8: 45006 (J:US)

INDIUM ARSENIDES
Refractivity
Refractive index of quaternary In/sub 1-x/Ga/sub x/As/sub y/P/sub 1-y/ lattice matched to InP, 8: 44300 (J:US)
Superlattices
In/sub x/Ga/sub 1-x/As-In/sub y/Ga/sub 1-y/As strained-layer superlattices: A proposal for useful, new electronic materials, 8: 44259 (J:US)
INDIUM BORIDES
Superconductivity
Investigation of the occurrence of superconductivity below the antiferromagnetic transition in Ho(Ir/sub 0.7/Rh/sub 0.3/)$_4$B$_4$, 8: 44249 (J:US)
INDIUM IONS
Electron-Ion Collisions
Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory, 8: 44890 (J:US)
INDIUM PHOSPHIDES
Energy Levels
Pressure induced conduction and valence band shifts in InP and GaAs from measurements at semiconductor—electrolyte interfaces, 8: 44297 (J:US)
Refractivity
Refractive index of quaternary In/sub 1-x/Ga/sub x/As/sub y/P/sub 1-y/ lattice matched to InP, 8: 44300 (J:US)
INDUSTRIAL PLANTS
See also COAL GASIFICATION PLANTS
COAL LIQUEFACTION PLANTS
COAL PREPARATION PLANTS
COKING PLANTS
ETHANOL PLANTS
FEED MATERIALS PLANTS
METHANOL PLANTS
NATURAL GAS PROCESSING PLANTS
PETROLEUM REFINERIES
SYNTHETIC FUELS REFINERIES
Boilers
Conversion to coal in Du Pont, 8: 43728 (RA:US)
Increased opportunities for coal in industrial markets, 8: 43265 (RA:US)
Rapidly expanding US market for industrial scale fluidized bed combustion, 8: 43258 (RA:US)
Retrofit of a package boiler to utilize producer gas, 8: 43730 (RA:US)
Energy Conservation
Assessment of the energy conservation potential and the effects of governmental measures on energy conservation on the 'decentralized heat supply' and medium-scale industry sectors, 8: 44025 (R:DE:In German)
Innovative financing for energy efficiency improvements. Phase III report. Summary and conclusions from field-test experience, 8: 44074 (R:US)
Personnel
Training Kentuckians for industrial jobs: a longitudinal study, 8: 45287 (R:US)
Water Pollution Control
Reduction of organic matter in macroporous weak anion exchanger and scavenger filter. Field studies, 8: 44745 (R:SE:In Swedish)
Water Treatment
Reduction of organic matter in macroporous weak anion exchanger and scavenger filter. Field studies, 8: 44745 (R:SE:In Swedish)
INDUSTRIAL SECTOR
See INDUSTRY
INDUSTRIAL WASTES
See also SPENT LIQUORS
Availability
Evaluation of potential for electrical generation using solid waste as fuel in the Pacific Northwest, 8: 44108 (R:US)
Pollution Control
Applications of nuclear and applied techniques in public health and pollution control. Proceedings, 8: 44005 (R:IN)
INDUSTRY
See also COAL INDUSTRY
FOOD INDUSTRY
GEOTHERMAL INDUSTRY
GLASS INDUSTRY
METAL INDUSTRY
NATURAL GAS INDUSTRY
NUCLEAR INDUSTRY
PETROLEUM INDUSTRY
PLASTICS INDUSTRY
SOLAR INDUSTRY
SYNTHETIC FUELS INDUSTRY
TEXTILE INDUSTRY
WOOD PRODUCTS INDUSTRY
Economic Analysis
Analytical assumptions and causal ordering in interindustry modeling, 8: 43989 (R:US)
Electric Power
Industrial electrification trend shows strength, 8: 44045 (J:US)
Energy Consumption
Industrial fuel use in relation to temperature, 8: 44046 (R:NL:In Dutch)
Fuel Substitution
Industrial electrification trend shows strength, 8: 44045 (J:US)
Noise Pollution Control
Proposals for acoustical requirements of the heating and power industry, 8: 44812 (R:SE:In Swedish)
Process Heat
Temperatures of industrial process heat, 8: 44098 (R:NL:In Dutch)
INERTIAL CONFINEMENT
A dynamic plasma confinement by inertial forces.
Beam Optics
Final focusing concepts in the HIBALL study, 8: 44526 (RA:DE)
Heavy Ion Accelerators
Use of a heavy-ion synchrotron facility for ICF studies, 8: 44474 (RA:DE)
Ion Beam Injection
Ion-beam-driven inertial confinement fusion. An overview, 8: 45238 (RA:JP)
Linear Accelerators
Beam dynamics in the HIBALL linear accelerators, 8: 44485 (RA:DE)
Berkeley research program on ion induction linacs for inertial fusion, 8: 44471 (RA:DE)
Meetings
Proceedings of symposium on inertial fusion with heavy ion beam, 8: 44878 (R:JP)
Research Programs
U.S. experimental program in inertial fusion, 8: 44528 (RA:DE)
Target Chambers
HIBALL target design: Ion-beam inertial confinement fusion pellet calculations, 8: 44532 (RA:DE)
HIBALL target and reactor neutronic and photonic calculations, 8: 44533 (RA:DE)
ICF-target studies of heavy ion fusion, 8: 44530 (RA:DE)
Importance of the beam geometry for the dynamical stability of inertial confinement fusion targets, 8: 44531 (RA:DE)
Neutron fuel interaction in a HIBALL target, 8: 45042 (RA:DE)
Recent U.S. target physics related research in heavy-ion inertial fusion, 8: 44529 (RA:DE)
INFLAMMATION
Diagnosis
Indium-111 labelled leucocyte scintigraphy in the diagnosis of inflammatory disease. A clinical study, 8: 44769 (R:NL)
INFORMATION
Technology Assessment
Informational technology and its impact on American education, 8: 44119 (R:US)
INFORMATION DISSEMINATION
Socio-Economic Factors
Informational technology and its impact on American education, 8: 44119 (R:US)
INFORMATION RETRIEVAL
Use of 'Direct File Organization' for 'Current Awareness'-Services, 8: 45322 (R:AT:In German)
INFORMATION SYSTEMS
Data Base Management
Proceedings of the 1982 integrated data users workshop, 8: 45321 (R:US)
Survey of AEC and NASA capabilities in computerized data management, 8: 44001 (RA:US)

Interagency Cooperation
Workshop reports, 8: 44004 (RA:US)
INHOMOGENEOUS PLASMA
Alfven Waves
Observation of spatial alfven resonance, 8: 45138 (R:JP)
Boltzmann-Vlasov Equation
Local WKB dispersion relation for the Vlasov—Maxwell equations, 8: 45157 (J:US)
High-Frequency Heating
Interaction of an electromagnetic wave with an inhomogeneous plasma slab, 8: 45113 (R:CS)
Short Wave Radiation
Numerical simulation of the interaction of an electromagnetic wave with an inhomogeneous plasma, 8: 45137 (RA:CS)
INJECTION (BEAMS)
See BEAM INJECTION
IN-SERVICE INSPECTION
Standards
Qualification of automated techniques for meeting ASME code and NRC requirements (PWR; BWR), 8: 43820 (R:US)
IN-SITU GASIFICATION
Field Tests
Centralia partial-seam CRIP test, 8: 43186 (R:US)
IN-SITU PROCESSING
See also IN-SITU GASIFICATION
IN-SITU RETORTING
Feasibility Studies
Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977, 8: 43304 (R:US)
IN-SITU RETORTING
Mathematical Models
Development of a local void-defect model which accounts for yield losses caused by flow nonuniformities, 8: 43303 (R:US)
INSTITUTO DE ENERGIA ATOMICA R1
See IEAR-1 REACTOR
INSTRUMENTS (MEASURING)
See MEASURING INSTRUMENTS
INSULATING LIMITERS
See LIMITERS
INSULATION (MAGNETIC)
See MAGNETIC INSULATION
INSULATION (THERMAL)
See THERMAL INSULATION
INSULATORS (ELECTRICAL)
See ELECTRICAL INSULATORS
INTEGRATED UTILITY SYSTEMS
See TOTAL ENERGY SYSTEMS
INTENSIFIERS (IMAGE)
See IMAGE INTENSIFIERS
INTERACTING BOSON MODEL
Aspects of the finite boson number in the IBA, 8: 45028 (R:US)
INTERCONNECTED POWER SYSTEMS
Dispersed Storage and Generation
Electric utility intertie issues for small, dispersed power sources, 8: 44041 (RA:US)
Inverters
Task 4 completion report for 40-kilowatt grid-connected modification contract, 8: 44056 (R:US)
Wind Power Plants
Investigate alternative interconnection strategies for arrays of wind-turbine generators. Final report, 8: 43718 (R:US)
Wind Turbines
Modification of power system operation for significant wind generation penetration, 8: 43722 (J:US)
INTERMEDIATE BTU GAS
250 to 900 Btu/ft³.
Market
Business criteria for coal gasification, 8: 43158 (RA:US)
INTERMEDIATES (REACTION)
See REACTION INTERMEDIATES
INTERMETALLIC COMPOUNDS
Ion Emission
Secondary ion emission from concentrated alloys and compounds, 8: 44863 (RA:SU:In Russian)
Sputtering
Secondary ion emission from concentrated alloys and compounds, 8: 44863 (RA:SU:In Russian)
INTERNAL COMBUSTION ENGINES
See also DIESEL ENGINES
GAS TURBINE ENGINES
Acoustic Testing
Objective acoustic quality inspection of complex machines, 8: 44120 (R:DE:In German)
Quality Control
Objective acoustic quality inspection of complex machines, 8: 44120 (R:DE:In German)
INTERNAL IRRADIATION
Radiation Doses
Dosimetry of internal emitters, 8: 44802 (J:DE:In English and German)
INTERSECTING STORAGE ACCELERATOR
See ISABELLE STORAGE RINGS
INTERSTELLAR GRAINS
Sputtering
Sputtering in astrophysics and planetary science, 8: 44824 (RA:SU)
IODINE
Emission Spectra
Measurement of the relative populations of I(²P°/sub 1/2/) and I(²P°/sub 3/2/) by laser induced vacuum ultraviolet fluorescence, 8: 44881 (J:US)
Fission Product Release
LWR loss of coolant accidents and conservatism in the anticipated release of iodine, 8: 43946 (R:AT:In German)
Fluorescence
Measurement of the relative populations of I(²P°/sub 1/2/) and I(²P°/sub 3/2/) by laser induced vacuum ultraviolet fluorescence, 8: 44881 (J:US)
Laser Spectroscopy
Measurement of the relative populations of I(²P°/sub 1/2/) and I(²P°/sub 3/2/) by laser induced vacuum ultraviolet fluorescence, 8: 44881 (J:US)
Radiation Protection Laws
Iodine determination in a PWR reactor during normal operation, 8: 43874 (R:FR:In French)
Radiochemistry
Iodine determination in a PWR reactor during normal operation, 8: 43874 (R:FR:In French)
IODINE 124
Positron Computed Tomography
In vivo imaging of the human thyroid with the Rutherford positron camera using ^{124}I, 8: 44777 (R:GB)
IODINE 125
Radiochemistry
Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers, 8: 44363 (R:DE:In German)
IODINE 127 TARGET
Pion Minus Reactions
Excitation functions of the ^{127}I(π^-,πxn) reactions in the region of the (3,3) resonance, 8: 45007 (J:US)
Pion Plus Reactions
Excitation functions of the ^{127}I(π^+,πxn) reactions in the region of the (3,3) resonance, 8: 45007 (J:US)
IODINE 133
Energy Levels
Population of ^{133}I from the beta decay of fission product ^{133}Te/sup g/ and the cluster-vibration model, 8: 45003 (J:US)
IODINE CHLORIDES
Raman Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_3/KI-LiI, I_3/CsCl-LiCl, and I_3-ICl/CsCl-LiCl, 8: 44340 (J:US)
Ultraviolet Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_3/KI-LiI, I_3/CsCl-LiCl, and I_3-ICl/CsCl-LiCl, 8: 44340 (J:US)
IODINE IODIDES
See IODINE

ION BEAM INJECTION
Inertial Confinement
Ion-beam-driven inertial confinement fusion. An overview, 8: 45238 (RA:JP)
ION BEAMS
See also ALUMINIUM 27 BEAMS
BORON 10 BEAMS
BORON 11 BEAMS
FLUORINE 19 BEAMS
HYDROGEN 1 MINUS BEAMS
LITHIUM 6 BEAMS
LITHIUM 7 BEAMS
MAGNESIUM 24 BEAMS
NITROGEN 14 BEAMS
OXYGEN 16 BEAMS
SODIUM 23 BEAMS
URANIUM 238 BEAMS
Beam Optics
Approach for calculations of the parameters of iion beams based on the paraxial equation, 8: 44496 (R:SU:In Russian)
Approach for calculations of the ion optical parameters of beams with high current density, 8: 44497 (R:SU:In Russian)
Beam Transport
Funneling of heavy ion beams, 8: 44486 (RA:DE)
Charge Exchange
Ab initio calculations of the charge state of a fast heavy ion stopping in a finite temperature target, 8: 44842 (RA:DE)
Computerized Simulation
Multi-dimensional computer simulation of intense beams, 8: 44484 (RA:DE)
Focusing
Final focusing of 10 GeV bismuth ions, 8: 44525 (RA:DE)
Pinch Effect
Thermal-resistive current filamentation in the cathode plasma of a pinch-reflex diode, 8: 44887 (J:US)
Plasma Filament
Thermal-resistive current filamentation in the cathode plasma of a pinch-reflex diode, 8: 44887 (J:US)
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
Stopping Power
Ions stopping in dense and hot matter, 8: 44841 (RA:DE)
ION BLOCKING
See ION CHANNELING
ION CHANNELING
Acoustic Monitoring
Hypersonic wave emission by channeling particles, 8: 45046 (RA:SU:In Russian)
Sound Waves
Hypersonic wave emission by channeling particles, 8: 45046 (RA:SU:In Russian)
ION CYCLOTRON-RESONANCE HEATING
See ICR HEATING
ION EXCHANGE MEMBRANES
See MEMBRANES
ION IMPLANTATION
Recoils
Experimental and theoretical consideration of recoil implantation, 8: 44872 (RA:SU)
ION SOURCES
Control Systems
Multichannel fiber-optical lines in the control system of the "Polaris" source, 8: 44543 (R:SU:In Russian)
Laser-Produced Plasma
Cyclotron acceleration of $C_{12}3i$ ions produced in a laser plasma, 8: 44548 (R:SU:In Russian)
Performance
High-concentration H_3^+ or D_2^+ ion source, 8: 44889 (J:US)
Remote Control
Multichannel fiber-optical lines in the control system of the "Polaris" source, 8: 44543 (R:SU:In Russian)
Reviews
Ion sources and low energy beam transport, 8: 44521 (RA:DE)
ION-ATOM COLLISIONS
Cross Sections
Cross section of elastic scattering of ions on atoms, 8: 44843 (RA:SU)
ION-DRAG ACCELERATORS
See ELECTRON-RING ACCELERATORS
IONIC CRYSTALS
Binding Energy
Ionic character of polar crystals: An extended Mulliken scheme for electronegativities, 8: 45074 (J:US)
Charge Transport
Ionic character of polar crystals: An extended Mulliken scheme for electronegativities, 8: 45074 (J:US)
Vacancies
Concerning the trapping of positrons in ionic solids, 8: 44318 (BA:NL)
IONIC REACTIONS
See IONS
ION-ION COLLISIONS
Reviews
Low energy charge changing cross sections, 8: 44840 (RA:DE)
IONIZATION CHAMBERS
Corrections
New look at displacement factor and point of measurement corrections in ionization chamber dosimetry, 8: 45062 (J:US)
IONS
Ions in solutions are indexed as compounds; ions in gases by the precoordinated descriptor consisting of the element name and the term ions; ions in beams by assigning either the specific name if available, e.g. ARGON 40 BEAMS
See also ANTIMONY IONS
ARGON IONS
CARBON IONS
CESIUM IONS
DEUTERIUM IONS
HELIUM IONS
HYDROGEN IONS
INDIUM IONS
KRYPTON IONS
MAGNESIUM IONS
MOLYBDENUM IONS
NEON IONS
NICKEL IONS
OXYGEN IONS
SULFUR IONS
URANIUM IONS
XENON IONS
Multiple Scattering
Multiple scattering of 57 keV ^{29}P in Si, 8: 44875 (RA:SU)
Stopping Power
Detailed analysis of the scope of the modified Firsov model, 8: 45051 (J:US)
IRAN
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
IRAQ
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
IRIDIUM ALLOYS
Photoelectron Spectroscopy
f-band dispersion in UIr_3: An angle-resolved and resonant photoemission study 8: 44223 (J:US)
IRIDIUM BORIDES
Magnetic Properties
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4B_4$, 8: 44242 (R:US)
Superconductivity
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4B_4$, 8: 44242 (R:US)
IRIDIUM ISOTOPES
Energy Levels
Single proton structure of /sup 193,195,197/Ir and perturbed spin(6) symmetry, 8: 45019 (J:US)

IRON
Biological Availability
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8: 44759 (R:US)
Chemical Activation
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8: 44349 (R:US)
Hydrogen Embrittlement
Influence of hydrogen on pure iron and steel at medium and high pressure levels, 8: 44174 (R:DE:In German)
Intestinal Absorption
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8: 44759 (R:US)
Sputtering
Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal, 8: 44865 (RA:SU)
Surface Properties
Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8: 44144 (RA:SU:In Russian)
IRON 56 REACTIONS
Fragmentation
Anomalous reaction mean free paths of nuclear projectile fragments from heavy ion collisions at 2A GeV, 8: 44982 (J:US)
IRON 56 TARGET
Neutron Reactions
Analysis of the recommended threshold reaction cross sections from the BOSPOR-80 library using integral experiment data, 8: 44995 (RA:SU:In Russian)
Pion Plus Reactions
Observation of analog and nonanalog transitions in the reaction $^{56}Fe(\pi^+,\pi^-)^{56}Ni$, 8: 44997 (J:US)
IRON 57
Moessbauer Effect
Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)
IRON BASE ALLOYS
See also CAST IRON
STEELS
Mechanical Properties
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Metallography
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
IRON BORIDES
Auger Electron Spectroscopy
Comment on "spin-polarized Auger spectroscopy from magnetically ordered solids", 8: 44329 (J:US)
IRON CARBIDES
See also CAST IRON
Coal
Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District, 8: 43192 (R:DE:In German)
IRON COMPLEXES
Catalytic Effects
Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983, 8: 44356 (R:US)
Fluorescence
Fe^* emission yield and photoionization of $Fe(CO)_5$ by vacuum-ultraviolet radiation, 8: 44357 (J:US)
Photochemical Reactions
Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983, 8: 44356 (R:US)
Photoionization
Fe^* emission yield and photoionization of $Fe(CO)_5$ by vacuum-ultraviolet radiation, 8: 44357 (J:US)
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)
IRON FLUORIDES
Phase Transformations
Critical behavior of a site-diluted three-dimensional Ising magnet, 8: 44293 (J:US)
IRON OXIDES
Aerosol Generators
Development of techniques for the preparation of monodisperse solid ferric oxide particles using the May spinning-top aerosol generator, 8: 44677 (RA:DE)
IRON SILICIDES
Crystal Field
Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)
Magnetization
Magnetism and crystalline electric fields in $R_3Fe_3Si_5$ compounds/sup /, 8: 44309 (J:US)
Specific Heat
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
Superconductivity
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
IRON SULFIDES
Coal
Investigations of iron disulfides and iron carbonates from mineral coal of the Ruhr District, 8: 43192 (R:DE:In German)
IRRADIATION PROCEDURES
Planning
Treatment of cancer of the uterus in developing countries: Proposals for a programme, 8: 44768 (R:XA)
IRREVERSIBLE PROCESSES
Entropy
Entropy balance for nonequilibrium steady states, 8: 45091 (J:IT)
ISABELLE
See ISABELLE STORAGE RINGS
ISABELLE STORAGE RINGS
Radiation Detectors
Detectors for CBA, 8: 44561 (R:US)
ISING MODEL
Entropy
Entropy of self-avoiding surfaces on the lattice, 8: 44962 (J:NL)
Magnetic Fields
Exact solution of a one-dimensional Ising model in a random magnetic field, 8: 45077 (J:US)
One-Dimensional Calculations
Exact solution of a one-dimensional Ising model in a random magnetic field, 8: 45077 (J:US)
Thermodynamic Properties
Exact solution of a one-dimensional Ising model in a random magnetic field, 8: 45077 (J:US)
ISOCHRONOUS CYCLOTRONS
See also TRIUMF CYCLOTRON
Beam Extraction
Experiments on the orbit expansion effect, 8: 44494 (R:SU:In Russian)
Hydrogen 1 Minus Beams
Intensity losses at H^- ion acceleration in the cyclic accelerators at low and medium energies, 8: 44551 (R:SU:In Russian)
Ion Sources
Cyclotron acceleration of C_{12}^{3+} ions produced in a laser plasma, 8: 44548 (R:SU:In Russian)
Losses
Intensity losses at H^- ion acceleration in the cyclic accelerators at low and medium energies, 8: 44551 (R:SU:In Russian)
Orbits
Experiments on the orbit expansion effect, 8: 44494 (R:SU:In Russian)
Scale Models
Magnetic system for investigation of the orbit expansion effect on the electron model of a ring cyclotron, 8: 44477 (R:SU:In Russian)

ISX TOKAMAK
Current-Drive Heating
ECH current drive on the ISX-B tokamak, 8: 45096 (RA:US)
ECR Heating
ECH current drive on the ISX-B tokamak, 8: 45096 (RA:US)
Impurities
Simulation of inertial and beam-driven effects on impurities in tokamak plasmas, 8: 45147 (R:US)
Neoclassical Transport Theory
Simulation of inertial and beam-driven effects on impurities in tokamak plasmas, 8: 45147 (R:US)
IUS
See TOTAL ENERGY SYSTEMS

J

JAILS
See PUBLIC BUILDINGS
JAPAN
Nuclear Energy
Nuclear energy and its public acceptance in Japan, 8: 44020 (R:BE:In French)
JET ENGINE FUELS
Prices
Petroleum marketing monthly, 8: 43285 (R:US)
Sales
Petroleum marketing monthly, 8: 43285 (R:US)
Specifications
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
JFT-2 TOKAMAK
Surface Cleaning
Surface cleaning by electron cyclotron resonance hydrogen plasma, 8: 45251 (RA:JP:In Japanese)
JINR SYNCHROTRON
Magnetic Surfaces
Position of the magnetic median surface in the magnet of the JINR synchrophasotron, 8: 44495 (R:SU:In Russian)
Performance
Dubna synchrophasotron. Operation and improvement (June - September, 1981), 8: 44537 (R:SU:In Russian)
JOSEPHSON JUNCTIONS
Hysteresis
Shot noise effect on the nonzero voltage state of the hysteretic Josephson junction, 8: 44394 (J:US)
Noise
Flicker (1/f) noise in tunnel junction DC SQUIDS, 8: 44398 (J:US)
Shot noise effect on the nonzero voltage state of the hysteretic Josephson junction, 8: 44394 (J:US)
JOULE HEATING
See also CURRENT-DRIVE HEATING
Energy Balance
Energy balance in TM-1-MH tokamak (ohmical heating), 8: 45122 (RA:CS)
JT-60 REACTORS
Thermal Expansion
Heat structural problems in JT-60, 8: 45266 (RA:JP:In Japanese)

K

K02
See KAONS NEUTRAL LONG-LIVED
KANGAROO RAT
See RODENTS
KAON MINUS REACTIONS
Strangeness-Exchange Reactions
Σ Hypernuclei, 8: 44926 (J:US)
KAON MINUS-PROTON INTERACTIONS
Elastic Scattering
Elastic scattering of π^{+-} and K^{+-} on protons at 100 and 200 GeV/c, 8: 44923 (J:US)
KAON PLUS REACTIONS
Fragmentation
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Inclusive Interactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
KAON PLUS-PROTON INTERACTIONS
Elastic Scattering
Elastic scattering of π^{+-} and K^{+-} on protons at 100 and 200 GeV/c, 8: 44923 (J:US)
KAONS
Particle Production
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
KAONS 2
See KAONS NEUTRAL LONG-LIVED
KAONS NEUTRAL LONG-LIVED
Leptonic Decay
Muon polarization in K/sub L/$\rightarrow\mu^+\mu^-$, 8: 44941 (J:US)
KENTUCKY
Coal Deposits
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
Coal Reserves
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
KERNKRAFTWERK STADE
See STADE REACTOR
KEROSENE
Prices
Petroleum marketing monthly, 8: 43285 (R:US)
Sales
Petroleum marketing monthly, 8: 43285 (R:US)
KETONES
See also ACETONE
Photolysis
Utilization of magnetic effects as a means of isotope enrichment. Annual technical progress report, July 1, 1982-June 30, 1983 (Dibenzyl ketone and substituted dibenzyl ketone on silica and zeolite), 8: 44348 (R:US)
KEVLAR
See ARAMIDS
KICKSORTERS
See PULSE ANALYZERS
KILNS
Dusts
Kiln dust-fly ash systems for highway bases and subbases, 8: 44100 (R:US)
Waste Product Utilization
Kiln dust-fly ash systems for highway bases and subbases, 8: 44100 (R:US)
KINK INSTABILITY
Internal modes in high-temperature plasmas, 8: 45100 (R:US)
KKS REACTOR
See STADE REACTOR
KOPPERS-TOTZEK PROCESS
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Overview of gasification technology, 8: 43179 (RA:US)
Comparative Evaluations
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
KORTEWEG-DE VRIES EQUATION
Numerical Solution
Pseudo-spectral numerical solution of the Korteweg-de Vries equation, 8: 45132 (RA:CS)
KRYPTON
Ion-Atom Collisions
Cross section of elastic scattering of ions on atoms, 8: 44843 (RA:SU)

KRYPTON 82
Energy Levels
Collective excitations of ^{82}Kr observed by in-beam and decay spectroscopy and their characterization by the interacting boson model, 8: 45001 (J:US)
Energy-Level Transitions
Collective excitations of ^{82}Kr observed by in-beam and decay spectroscopy and their characterization by the interacting boson model, 8: 45001 (J:US)
KRYPTON IONS
Collisions
Electron emission from metal-film systems under atomic particle bombardment, 8: 44871 (RA:SU:In Russian)
KUWAIT
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)

L

LA CROSSE BOILING WATER REACTOR
See LACBWR REACTOR
LABELLED COMPOUNDS
Compounds labelled with either stable or radioactive isotopes.
Stability
Temperature-dependent dissociation of homologous in-vivo produced complexes of ^{125}I-des-AB fibrin monomers, 8: 44363 (R:DE:In German)
LABORATORY EQUIPMENT
Electric Grounds
Grounding guidelines: practical examples for power systems at LLNL, 8: 44447 (R:US)
LACBWR REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
LACTATES
Decarboxylation
Thermochemical conversion of biomass to ethanol. Final report, 8: 43451 (R:US)
LACTIC ACID
Biosynthesis
Production of lactic acid by high-speed fermentation method, 8: 43528 (TJ:US)
LAKES
Acidification
Timing of acidification-induced biological changes in lakes and the relationship to predator-prey interactions, 8: 44733 (RA:DK)
Chemical Composition
Acid rain, catchment chracteristics and fishery status, 8: 44732 (RA:DK)
LAMBDA-2250 RESONANCES
Binding Energy
Binding energy estimates for charmed few-body systems, 8: 44938 (J:US)
LAMBDA-2260 RESONANCES
See LAMBDA-2250 RESONANCES
LAMINAR FLOW
Equations
Analysis of the flow close to a hump at the wall of a circular pipe, 8: 44907 (R:BR:In Portuguese)
LAND RECLAMATION
Revegetation
Reclaiming mined lands in arid environments, 8: 43252 (R:US)
LAND TRANSPORT
See also ROAD TRANSPORT
Fuel Consumption
Energy consumption in road transport: data-collection requirements, 8: 44088 (R:US)
LAND USE
Computerized Simulation
Economic impact of increased biomass production for fuels and chemical feedstocks on food production and agricultural crops, 8: 43514 (BA:US)
Environmental Impacts
Land use and transportation impact on air quality, 8: 43996 (RA:US)
Environmental Policy
Research problems and issues in the application of land use controls to environmental protection, 8: 43997 (RA:US)
LANGMUIR OSCILLATIONS
See PLASMA WAVES
LANGUAGES (PROGRAMMING)
See PROGRAMMING LANGUAGES
LANTHANIDES
See RARE EARTHS
LANTHANUM 148
Beta-Minus Decay
Levels in ^{148}Ce from the decay of mass separated ^{148}La, 8: 45026 (J:US)
LANTHANUM ALLOYS
Critical Temperature
Two critical points on the γ-α phase boundary of cerium alloys, 8: 44221 (J:US)
Phase Diagrams
Two critical points on the γ-α phase boundary of cerium alloys, 8: 44221 (J:US)
LANTHANUM CHROMITES
See CHROMIUM OXIDES
LANTHANUM FLUORIDES
Coprecipitation
Selective laser excitation of terbium(III) in lanthanum(III) fluoride precipitates, 8: 44330 (J:US)
LARYNX
Radiotherapy
Radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx, 8: 44773 (R:PL:In Polish)
LASER FUSION REACTORS
Energy Transfer
Uniformity of energy deposition for laser driven fusion, 8: 45270 (J:US)
Laser-Produced Plasma
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Neodymium Lasers
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Simulation
Pulse propagation properties in high-power CO_2 laser system for laser fusion, 8: 45227 (R:JP)
Solid State Lasers
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
LASER IMPLOSIONS
Ablation
Measurements of ablation pressure and mass ablation rate using a target pendulum and a thin foil target at 10 μm laser wavelength, 8: 45226 (R:JP)
Reviews
Laser fusion (for pedestrians), 8: 45220 (R:IL)
LASER RADIATION
Alignment
Measurement of laser beam divergence, 8: 44406 (J:US)
Beam Optics
Measurement of laser beam divergence, 8: 44406 (J:US)
Harmonics
Harmonic generation of radiation in a steep density profile, 8: 45166 (J:US)
Interactions
Parametric instabilities near the critical density in steepened density profiles, 8: 45164 (J:US)
Spatial Distribution
Numerical calculations of the ray trace, absorption distribution and absorption efficiency of the laser beam in spherical symmetric plasmas, 8: 45228 (R:JP)

LASER SPECTROSCOPY
Extreme Ultraviolet Radiation
Laser techniques for extreme-ultraviolet spectroscopy, 8: 44631 (R:US)
Fiber Optics
Use of fiber optics and laser-induced fluorescence for remote measurements of UF_6 in strong rotation, 8: 44639 (R:US)
LASER TARGETS
Ablation
Ion velocity measurements for laser mass ablation studies, 8: 45245 (RA:CS)
Coatings
Coating of laser fusion targets by plasma polymerized organic thin films, 8: 43415 (RA:CS)
Data Acquisition Systems
Use of ORACLE in a scientific environment, 8: 45265 (R:US)
Data Processing
Use of ORACLE in a scientific environment, 8: 45265 (R:US)
Defects
Scattering of light by laser fusion targets with small defects, 8: 45273 (J:US)
Holography
Image-enhancement tools for tracing fringe patterns in holographic interferograms acquired during laser-fusion experiments. KMSF-U-1346, 8: 45214 (R:US)
Interferometry
Image-enhancement tools for tracing fringe patterns in holographic interferograms acquired during laser-fusion experiments. KMSF-U-1346, 8: 45214 (R:US)
Light Scattering
Scattering of light by laser fusion targets with small defects, 8: 45273 (J:US)
Rayleigh-Taylor Instability
Rayleigh-Taylor instability and resulting failure modes of ablatively imploded inertial-fusion targets, 8: 45261 (R:US)
Research Programs
LLE Review. Quarterly report, July 1982-September 1982, 8: 45212 (R:US)
X-Ray Spectra
X ray emission experiments at 1.06 μm and 0.35 μm, 8: 44836 (R:FR)
X-Ray Spectrometers
Crystal-diffraction system for spectroscopy, imaging, and interferometry of inertially confined fusion targets. Final report for the period ending January 1, 1983, 8: 45213 (R:US)
LASER-PRODUCED PLASMA
Ion velocity measurements for laser mass ablation studies, 8: 45245 (RA:CS)
Absorption
Numerical calculations of the ray trace, absorption distribution and absorption efficiency of the laser beam in spherical symmetric plasmas, 8: 45228 (R:JP)
Charged-Particle Transport
Characteristics of transported ion beam in laser-initiated plasma channels, 8: 45110 (R:JP)
Electron Temperature
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Emission Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Jets
Evidence for plasma jet formation in long-pulse laser irradiation of thin planar Al targets, 8: 44208 (J:US)
Laser Targets
Measurements of ablation pressure and mass ablation rate using a target pendulum and a thin foil target at 10 μm laser wavelength, 8: 45226 (R:JP)
Magnetic Fields
Theory and simulation of one-dimensional Raman backward and forward scattering, 8: 45165 (J:US)
Nonlinear Problems
Harmonic generation of radiation in a steep density profile, 8: 45166 (J:US)
Population Inversion
Population inversion and gain measurements for soft x-ray-laser development in a magnetically confined plasma column, 8: 44400 (R:US)
Radiations
Harmonic generation of radiation in a steep density profile, 8: 45166 (J:US)
Raman Effect
Theory and simulation of one-dimensional Raman backward and forward scattering, 8: 45165 (J:US)
Reviews
Laser fusion (for pedestrians), 8: 45220 (R:IL)
Visible Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
LASERS
Light Amplification by Stimulated Emission of Radiation.
See also FREE ELECTRON LASERS
GAS LASERS
SOLID STATE LASERS
X-RAY LASERS
Mode Locking
Analysis of mode locking by synchronous pumping of a gain medium with long decay time, 8: 44405 (J:US)
LASL
Zero Power Reactors
Pajarito Plan for Radiation Emergency. Standard operating procedures, 8: 43894 (R:US)
LATENT HEAT STORAGE
Phase Change Materials
New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report, 8: 43651 (R:US)
Thermal Energy Storage Equipment
New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report, 8: 43651 (R:US)
LATTICE FIELD THEORY
CP Invariance
Four-dimensional CP^2 model on a lattice, 8: 44953 (J:US)
Gauge Invariance
Numerical studies of renormalization in SU(3) gauge theory in four dimensions, 8: 44954 (J:US)
Phase Diagrams
Entropy of self-avoiding surfaces on the lattice, 8: 44962 (J:NL)
Renormalization
Numerical studies of renormalization in SU(3) gauge theory in four dimensions, 8: 44954 (J:US)
Renormalization of U(1) lattice gauge actions, 8: 44963 (J:NL)
LATTICES (CRYSTAL)
See CRYSTAL LATTICES
LATTICES (REACTOR)
See REACTOR LATTICES
LAWRENCE LIVERMORE LABORATORY
Research Programs
Program report for FY 1982: Atmospheric and Geophysical Sciences Division of the Physics Department, 8: 44691 (R:US)
LEACHATES
Chemical Analysis
Studies on the leaching and weathering processes of coal ashes, 8: 43201 (RA:DK)
Chemical Composition
Coal conversion solid waste disposal, 8: 43221 (J:US)
Disposal of waste material. Evaluation in the KHM project of short and long-term effects, 8: 43195 (RA:DK)
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8: 43306 (R:US)
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Multi-Element Analysis
Comparison of different methods for estimating the leaching of heavy metals from coal combustion waste, 8: 43202 (RA:DK)
Toxicity
Coal conversion solid waste disposal, 8: 43221 (J:US)

Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)

LEAD
Argon 40 Reactions
Charged-particle exclusive analysis of central Ar+KCl and Ar+Pb reactions at 1.8 and 0.8 GeV nucleon, 8: 45023 (J:US)
Biological Accumulation
Fucus Vesiculosus as a bioaccumulator of heavy metals, 8: 44807 (R:DE:In German)
Biological Availability
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8: 44759 (R:US)
Intestinal Absorption
Bioavailability of iron, lead, and cadmium via gastrointestinal absorption: a review, 8: 44759 (R:US)
Kaon Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Neutron Reactions
Neutron elastic scattering in the energy region 1.5 to 4.0 MeV for radiogenic lead and bismuth, 8: 45015 (R:SE)
Neutron Transport
Experimental study of the neutron spectra of lead, using a 14 MeV neutron source, 8: 45056 (TJ:DE:In German)
Measurement of parity non-conserving neutron spin rotation in lead and tin, 8: 45053 (J:NL)
Pion Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Proton Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)

LEAD 206 TARGET
Triton Reactions
Two-step contributions in the ^{206}Pb(t,p) ^{208}Pb two-neutron transfer reaction, 8: 45018 (J:US)

LEAD 208
Energy
Two-step contributions in the ^{206}Pb(t,p) ^{208}Pb two-neutron transfer reaction, 8: 45018 (J:US)

LEAD 208 TARGET
Proton Reactions
"Wine-bottle" optical potentials and the inelastic scattering of protons near 200 MeV, 8: 44998 (J:NL)
Triton Reactions
Structure of ^{209}Bi deduced from the ^{208}Pb(t,2nγ) reaction, 8: 45017 (J:US)

LEAD 209 TARGET
Proton Reactions
Dirac-equation impulse approximation for intermediate-energy nucleon-nucleus scattering, 8: 44996 (J:US)

LEAD 210
Radionuclide Migration
Direct analysis of ^{210}Pb in sediment samples: Self-absorption corrections, 8: 44719 (J:NL)

LEAD COMPOUNDS
See also LEAD SULFIDES
TEL
Hydroxyl Radicals
Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air, 8: 44688 (R:DK)
Lifetime
Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air, 8: 44688 (R:DK)

LEAD ISOTOPES
See also LEAD 208
LEAD 210
Nuclear Radii
Laser induced fluorescence spectroscopy in atomic beams of radioactive nuclides, 8: 44879 (R:DE)

LEAD SULFIDES
Physical Radiation Effects
Mechanism for damage and sputtering of non-metals by low energy ions, 8: 44266 (RA:SU)
Sputtering
Mechanism for damage and sputtering of non-metals by low energy ions, 8: 44266 (RA:SU)

LEAKAGE
See LEAKS

LEAKS
Detection
Acoustic technique for pinpointing leaks in low-pressure gas mains, 8: 43297 (R:US)

LENINGRAD SYNCHROCYCLOTRON
Beam Monitors
Measurements of the mean energy of proton beam (approximately 1 GeV) extracted from the LINF synchrocyclotron using the Cherenkov method of double reflections, 8: 44542 (R:SU:In Russian)

LEPTON REACTIONS
Scattering
Conventional approach to the problem of the deuteron smearing corrections, 8: 44970 (J:US)

LEPTON-DEUTERON INTERACTIONS
See DEUTERIUM TARGET
LEPTON REACTIONS

LET
Response Modifying Factors
Influence of hyperthermia on the biological effects of low LET-radiation with different energy spectra, 8: 44794 (R:DE:In German)

LIBRARIES
Daylighting
Mount Airy Public Library, Mount Airy, North Carolina, 8: 43603 (RA:US)
Direct Gain Systems
Mount Airy Public Library, Mount Airy, North Carolina, 8: 43603 (RA:US)

LIGHT GUIDES
See OPTICAL FIBERS

LIGHT NUCLEI
For nuclei with mass 1-40.
See also ALUMINIUM 28
ARGON 38
ARGON 40
BORON 11
BORON 12
BORON 13
CARBON 11
CARBON 13
CARBON 15
CARBON 16
CHLORINE 34
DEUTERIUM
FLUORINE 19
HELIUM 4
HELIUM 8
MAGNESIUM 29
MAGNESIUM 30
NITROGEN 14
OXYGEN 15
OXYGEN 16
OXYGEN 17
OXYGEN 19
SILICON 28
TRITIUM
Binding Energy
Relativistic effects in the binding energies of few-body nuclei, 8: 44969 (R:US)
Hypernuclei
Binding energy estimates for charmed few-body systems, 8: 44938 (J:US)
Many-Body Problem
Relativistic effects in the binding energies of few-body nuclei, 8: 44969 (R:US)

LIGHT SCATTERING
Computerized Simulation
Scattering of light by laser fusion targets with small defects, 8: 45273 (J:US)

LIGHT TRANSMISSION
Measuring Methods
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)

LIGHT WATER COOLED REACTORS
See WATER COOLED REACTORS
LIGHT WATER MODERATED REACTORS
See WATER MODERATED REACTORS
LIGNIN
Uses
Uses of by-product lignins from alcohol fuel processes, 8: 43457 (J:US)
LIMESTONE
Phase Transformations
Nonhydrostatic effects in stress-wave induced phase transformation of calcite, 8: 44284 (R:US)
LIMITERS
Protective Coatings
Features of arc formation on the limiter with a dielectric film in current discharge, 8: 45237 (RA:SU:In Russian)
LINACS
See LINEAR ACCELERATORS
LINEAR ACCELERATORS
See also QUADRUPOLE LINACS
STANFORD LINEAR COLLIDER
Beam Bunching
Bunching of intense beams, 8: 44490 (RA:DE)
Beam Dynamics
Beam dynamics in the HIBALL linear accelerators, 8: 44485 (RA:DE)
Funneling of heavy ion beams, 8: 44486 (RA:DE)
Hollow beam concept for producing intense beams, 8: 44489 (RA:DE)
Beam Emittance
Space-charge and emittance blowup in linacs, 8: 44481 (RA:DE)
Beam Transport
GSI Wideroe experiments, 8: 44482 (RA:DE)
Space charge problems in final beam transport, bunching and focusing, 8: 44491 (RA:DE)
Electron-Ring Accelerators
Head model of SILUND-20 linear induction accelerator, 8: 44476 (R:SU:In Russian)
Heavy Ion Accelerators
Berkeley research program on ion induction linacs for inertial fusion, 8: 44471 (RA:DE)
On-Line Control Systems
Automation of measurements, parameter correction and control of the LIU-30 accelerator, 8: 44539 (R:SU:In Russian)
On-Line Measurement Systems
Automation of measurements, parameter correction and control of the LIU-30 accelerator, 8: 44539 (R:SU:In Russian)
Proton Beams
SNQ linac - a technological step towards a fusion driver, 8: 44472 (RA:DE)
Specifications
Accelerator breeder with uranium, thorium target, 8: 43836 (R:US)
LINEAR ENERGY TRANSFER
See LET
LIPOSOMES
Permeability
Chloride permeability of large unilamellar lipidic vesicles, 8: 44757 (R:FR)
LIPS
See ORAL CAVITY
LIQUID CRYSTALS
Positrons
Positron annihilation in a homologous series of liquid crystals, 8: 44322 (BA:NL)
LIQUID EFFLUENTS
See LIQUID WASTES
LIQUID FUELS
See also FUEL OILS
GASOHOL
GASOLINE
KEROSENE
Production
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
LIQUID METAL COOLANT
See LIQUID METALS
LIQUID METAL TEST FACILITIES
See TEST FACILITIES
LIQUID METALS
Two-Phase Flow
Survey of studies on the flow and heat transfer of two-component, two-phase flow of liquid metal in magnetic field, 8: 45268 (RA:JP:In Japanese)
LIQUID SCINTILLATORS
Efficiency
Calculation of the detection efficiency in liquid scintillators. II. Single positron emitters, 8: 44579 (R:ES:In Spanish)
Calculation of the detection efficiency in liquid scintillators. III. Single electron-capture radionuclides, 8: 44580 (R:ES:In Spanish)
LIQUID WASTES
See also SPENT LIQUORS
WASTE WATER
Combustion
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
Pollution Control
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Waste Processing
Utilization of waste streams in biomass gasifiers, 8: 43431 (RA:US)
LIQUIDS
See also COAL LIQUIDS
LIQUID CRYSTALS
LIQUID METALS
Surface Tension
Apparatus for the precise measurement of the physical properties of liquids at elevated temperature and pressure, 8: 44647 (J:US)
Viscosity
Apparatus for the precise measurement of the physical properties of liquids at elevated temperature and pressure, 8: 44647 (J:US)
LITHIUM
Crystal-Phase Transformations
Experimental phase diagram of lithium-intercalated graphite, 8: 44258 (J:US)
Equations of State
High-pressure equation of state of Li, Na, and K, 8: 44199 (R:US)
Phase Diagrams
Experimental phase diagram of lithium-intercalated graphite, 8: 44258 (J:US)
LITHIUM 6 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
LITHIUM 7 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
LITHIUM 7 TARGET
Helium 3 Reactions
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
LITHIUM CHLORIDES
Raman Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_3/KI-LiI, I_3/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8: 44340 (J:US)
Ultraviolet Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_3/KI-LiI, I_3/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8: 44340 (J:US)
LITHIUM FLUORIDES
Vacancies
Concerning the trapping of positrons in ionic solids, 8: 44318 (BA:NL)

LITHIUM IODIDES
Raman Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_2/KI-LiI, I_2/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8: 44340 (J:US)
Ultraviolet Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_2/KI-LiI, I_2/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8: 44340 (J:US)
LIZARDS
Population Dynamics
Competition between West Indian anoles and birds, 8: 44714 (J:US)
Predator-Prey Interactions
Competition between West Indian anoles and birds, 8: 44714 (J:US)
LMFBR TYPE REACTORS
See also BELOYARSK-3 REACTOR
Flowmeters
Metrology installation for studies of the accuracy of correlation methods for sodium flow rate measurements, 8: 43812 (R:SU:In Russian)
Fuel Assemblies
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Fuel Channels
URANUS investigations on coolant channel temperature for Mol 7c, 8: 43924 (RA:DE:In German)
Fuel Element Clusters
Comparison of the interchannel mixing coefficients for different variants of rod screw ribbing, 8: 43803 (R:SU:In Russian)
Impact of gas in sodium flow on the temperature variation of an LMFBR rod bundle, 8: 43808 (R:DE)
Use of the URANUS code at Karlsruhe Nuclear Research Center, 8: 43926 (RA:DE:In German)
Fuel Elements
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8: 43746 (R:US)
Fuel Pins
Investigations on the transient version of URANUS, 8: 43925 (RA:DE:In German)
Irradiation experiment Mol-7B, 8: 43809 (R:DE:In German)
Present state of the URANUS code, 8: 43811 (RA:DE:In German)
Studies on the mechanics of fuel rods and fuel subassemblies - studies on the simulation irradiation project, 8: 43923 (R:DE:In German)
Heat Exchangers
Leakage-flow-induced vibration of a tube-in-tube slip joint, 8: 43799 (R:US)
Loss of Flow
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Physics of reactor safety. Quarterly report, January-March 1983, 8: 43945 (R:US)
URANUS investigations on coolant channel temperature for Mol 7c, 8: 43924 (RA:DE:In German)
Planning
Probabilistic analysis of alternative strategies for US FBR development, 8: 43813 (R:US)
Reactor Accidents
Probabilistic methods for identification of significant accident sequences in loop-type LMFBRs, 8: 43941 (R:US)
Reactor Components
Review of leakage-flow-induced vibrations of reactor components, 8: 43798 (R:US)
Reactor Cores
Recent developments in the central worth discrepancy, 8: 43817 (R:US)
Reactor Kinetics
Recent developments in the central worth discrepancy, 8: 43817 (R:US)
Utility subroutine package used by Applied Physics Division export codes, 8: 43797 (R:US)
Reactor Materials
Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9, 8: 43802 (R:US)
Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9, 8: 43801 (R:US)
Representation of the simulation irradiation project, 8: 44171 (RA:DE:In German)
Simulation irradiation of binary copper alloys, 8: 44168 (RA:DE:In German)
Simulation irradiation of segregation-hardening Al and Ni alloys, 8: 44170 (RA:DE:In German)
Swelling behavior of ferrites and austenites exposed to heavy ions, 8: 44169 (RA:DE:In German)
Spent Fuel Storage
Safety of storage facilities for LMFBR spent fuels, 8: 43342 (R:FR:In French)
Thorium Cycle
Possible types of breeders with thorium cycle, 8: 43805 (RA:BR:In Portuguese)
Transient Overpower Accidents
Physics of reactor safety. Quarterly report, January-March 1983, 8: 43945 (R:US)
Transients
Investigations on the transient version of URANUS, 8: 43925 (RA:DE:In German)
Two-dimensional model for transients calculations with phase changes in sodium cooled reactors, 8: 43920 (RA:BR:In Portuguese)
LNG SPILLS
See GAS SPILLS
LOAD (DYNAMIC)
See DYNAMIC LOADS
LOCA
See LOSS OF COOLANT
LOCAL GOVERNMENT
Energy Management
Massachusetts Local Energy Action Program, 8: 43488 (RA:US)
Energy Policy
Massachusetts Local Energy Action Program, 8: 43488 (RA:US)
LOFT REACTOR
Data Processing
LOFT uncertainty-analysis methodology, 8: 43886 (R:US)
Research Programs
LOFT uncertainty-analysis methodology, 8: 43886 (R:US)
LONGWALL MINING
Constraints
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report (Advance vs retreat), 8: 43248 (R:US)
Economic Analysis
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report (Advance vs retreat), 8: 43248 (R:US)
Feasibility Studies
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report (Advance vs retreat), 8: 43248 (R:US)
Mine Roadways
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report (Advance vs retreat), 8: 43248 (R:US)
Research Programs
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report (Advance vs retreat), 8: 43248 (R:US)
LOOPS (COOLANT)
See COOLANT LOOPS
LOS ALAMOS SCIENTIFIC LABORATORY
See LASL
LOSS OF COOLANT
Failure Mode Analysis
Using event trees to quantify the effect of post-TMI modifications on PORV-related LOCA probability (PWR), 8: 43826 (BA:US)

Fission Product Release
Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500, 8: 43922 (R:DE:In German)
Heat Transfer
Adaptation of TOODEE-2 computer code for reflood analysis in Angra-1 reactor (FLECHT experiments), 8: 43916 (RA:BR:In Portuguese)
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a (BWR), 8: 43906 (R:US)
Modifications of the bubble rise model and heat transfer model used in RELAP 4/Mod 5 computer code for transient analysis (Small break accident), 8: 43915 (RA:BR:In Portuguese)
PWR small-break analysis using a PDP-11/AD10 computer system, 8: 43900 (R:US)
Thermal/Hydraulic Analysis Research Program. Quarterly report, July-September 1982 (PWR), 8: 43938 (R:US)
Hydraulics
Adaptation of TOODEE-2 computer code for reflood analysis in Angra-1 reactor (FLECHT experiments), 8: 43916 (RA:BR:In Portuguese)
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a (BWR), 8: 43906 (R:US)
Modifications of the bubble rise model and heat transfer model used in RELAP 4/Mod 5 computer code for transient analysis (Small break accident), 8: 43915 (RA:BR:In Portuguese)
PWR small-break analysis using a PDP-11/AD10 computer system, 8: 43900 (R:US)
Thermal/Hydraulic Analysis Research Program. Quarterly report, July-September 1982 (PWR), 8: 43938 (R:US)
PWR Type Reactors
UK MT-3 ballooning test in the Battelle NRU loop (PWR), 8: 43896 (R:GB)
Radiation Hazards
LWR loss of coolant accidents and conservatism in the anticipated release of iodine, 8: 43946 (R:AT:In German)
Risk Assessment
Using event trees to quantify the effect of post-TMI modifications on PORV-related LOCA probability (PWR), 8: 43826 (BA:US)
Simulation
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
Thermal Stresses
Experiment operations plan for the MT-3 experiment in the NRU reactor (PWR), 8: 43937 (R:US)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description (PWR), 8: 43897 (R:GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes (PWR), 8: 43898 (R:GB)
UK MT-3 ballooning test in the Battelle NRU loop (PWR), 8: 43896 (R:GB)
Two-Phase Flow
Modifications of the bubble rise model and heat transfer model used in RELAP 4/Mod 5 computer code for transient analysis (Small break accident), 8: 43915 (RA:BR:In Portuguese)

LOSS OF FLOW
After-Heat Removal
Physics of reactor safety. Quarterly report, January-March 1983 (LMFBR), 8: 43945 (R:US)
Heat Transfer
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Physics of reactor safety. Quarterly report, January-March 1983 (LMFBR), 8: 43945 (R:US)
URANUS investigations on coolant channel temperature for Mol 7c (LMFBR), 8: 43924 (RA:DE:In German)
Hydraulics
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
Calculation of mixed convection in the intertube space of liquid metal heat exchangers, 8: 43908 (R:SU:In Russian)
Physics of reactor safety. Quarterly report, January-March 1983 (LMFBR), 8: 43945 (R:US)
URANUS investigations on coolant channel temperature for Mol 7c (LMFBR), 8: 43924 (RA:DE:In German)

LOSS OF FLUID TEST REACTOR
See LOFT REACTOR

LOUISIANA
Mineral Resources
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)
Salt Deposits
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)
Exploratory shaft conceptual design report: Gulf Interior Region salt domes (Richton, Vacherie, Cypress domes), 8: 43369 (R:US)
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume II, 8: 43372 (R:US)
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume I, 8: 43371 (R:US)

LOW BTU GAS
150 to 250 Btu/ft³.
Calorific Value
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8: 43162 (R:US)
Market
Business criteria for coal gasification, 8: 43158 (RA:US)
Production
Coal gasification at Caterpillar's York, Pennsylvania, plant, 8: 43180 (RA:US)
Combustion engineering two-stage, atmospheric-pressure, entrained-flow coal-gasification process-development-unit program. Final report, 8: 43162 (R:US)
Fluidized-bed energy technology for biomass conversion, 8: 43443 (J:US)

LOW-BETA PLASMA
Beta from 0 to 0.01.
Drift Instability
Linear theory of drift instability, 8: 45140 (RA:JP)
Electron Drift
Nonresonant electron transport in the ELMO Bumpy Torus experiment using a BGK operator, 8: 45180 (J:US)
Kinetic Equations
Nonresonant electron transport in the ELMO Bumpy Torus experiment using a BGK operator, 8: 45180 (J:US)

LOWER HYBRID HEATING
Current-drive experiments on the PLT Tokamak, 8: 45148 (R:US)
Investigation of lower hybrid resonance heating in tokamak FT-1 and FT-2, 8: 45114 (RA:CS:In Russian)
Lower-hybrid heating experiment on the TM-1-MH tokamak, 8: 45117 (RA:CS)
Microwave Equipment
Hf apparatus for plasma heating at lower hybrid resonance on tokamak T-7, 8: 45242 (RA:CS)

Optimization
Power spectrum optimization of the three-waveguide grill for the T-7 tokamak, 8: 45243 (RA:CS)
Reflection
Echo phenomenon associated with lower-hybrid-wave launching, 8: 45150 (R:US)
LOWER HYBRID RESONANCE HEATING
See LOWER HYBRID HEATING
LOW-LEVEL RADIOACTIVE WASTES
Forecasting
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Information Systems
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Inventories
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
LUBRICATING OILS
Wear
Testing of the antiwear properties of synthetic engine oils by the use of radionuclide technique, 8: 44608 (R:DE:In German)
LUMBER INDUSTRY
See WOOD PRODUCTS INDUSTRY
LUMINESCENT CONCENTRATORS
Doped Materials
Development of materials for a luminescent solar collector. Final report, September 1, 1979-December 31, 1982, 8: 43646 (R:US)
LUNGS
Radiotherapy
Radiation therapy of cancer of the lung, 8: 44775 (R:PL:In Polish)
LURGI PROCESS
Overview of gasification technology, 8: 43179 (RA:US)
Comparative Evaluations
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Performance Testing
Kentucky coal tests in a commercial Lurgi gasifier (Tri-State Project), 8: 43153 (RA:US)
LURGI SLAGGING PROCESS
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
LUTETIUM 172
Isotope Production
Generator production of ^{172}Lu from ^{172}Hf for limited nuclear medicine research, 8: 44366 (J:CH)
Radiochemistry
Generator production of ^{172}Lu from ^{172}Hf for limited nuclear medicine research, 8: 44366 (J:CH)
Solvent Extraction
Generator production of ^{172}Lu from ^{172}Hf for limited nuclear medicine research, 8: 44366 (J:CH)
LUTETIUM SILICIDES
Specific Heat
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
Superconductivity
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
LWGR TYPE REACTORS
Reactor Materials
Development of the installation for zirconium alloy corrosion testing in superheated steam flow in a reactor channel, 8: 43792 (R:SU:In Russian)
LWR TYPE REACTORS
See WATER COOLED REACTORS

M

MA 754
See NICKEL BASE ALLOYS
MA 956
See IRON BASE ALLOYS
MAGNESIUM
Catalytic Effects
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Dehydridation
Magnesium hydride for load-leveling energy storage. Final report, 8: 43420 (R:XE)
Hydridation
Magnesium hydride for load-leveling energy storage. Final report, 8: 43420 (R:XE)
MAGNESIUM 24 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
MAGNESIUM 24 TARGET
Alpha Reactions
Alpha capture into the giant quadrupole resonance in ^{28}Si, 8: 44992 (J:US)
MAGNESIUM 26 TARGET
Pion Reactions
Pion single and double charge exchange in the resonance region: Dynamical corrections, 8: 45034 (J:US)
MAGNESIUM 29
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
MAGNESIUM 30
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)
MAGNESIUM CHLORIDES
Formation Heat
Enthalpies of formation of strontium dichloride and of the strontium ion (Sr^{2+}) in water and in 1 mol.dm^{-3} HCl, and an assessment of enthalpies of formation of alkaline-earth dichlorides, 8: 44338 (J:GB)
MAGNESIUM COMPLEXES
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)
MAGNESIUM IONS
Collisions
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
Ionization
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
X-Ray Spectra
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)
MAGNESIUM OXIDES
See also SPINELS
F Centers
Hydrogen in MgO crystals thermochemically reduced at very high temperatures, 8: 44261 (R:US)
MAGNETIC BREMSSTRAHLUNG
See SYNCHROTRON RADIATION
MAGNETIC FIELD CONFIGURATIONS
For pinch configurations, use the narrower terms of PINCH EFFECT.
See also MAGNETIC FIELD RIPPLES
Optimization
Reduction of radial losses in bumpy tori, 8: 45162 (J:US)
MAGNETIC FIELD RIPPLES
Ripple-reduction poloidal-field coils for tokamak reactors, 8: 45218 (R:US)

MAGNETIC FILTERS
Performance Testing
Development of magnetic filters for the primary-coolant circuit of a PWR, 8: 43788 (R:US)
Specifications
Development of magnetic filters for the primary-coolant circuit of a PWR, 8: 43788 (R:US)
MAGNETIC INSULATION
Insulation of electric fields by means of magnetic fields; not for insulation of the magnetic fields themselves.
Polarons
Small-polaron hopping in magnetic semiconductors, 8: 45075 (J:US)
Transport Theory
Small-polaron hopping in magnetic semiconductors, 8: 45075 (J:US)
MAGNETIC MATERIALS
See also ANTIFERROMAGNETIC MATERIALS
Auger Electron Spectroscopy
Comment on "spin-polarized Auger spectroscopy from magnetically ordered solids", 8: 44329 (J:US)
MAGNETIC MIRROR TYPE REACTORS
See also FIELD-REVERSED MIRROR REACTORS
MARS REACTOR
Planning
National Mirror Fusion Program Plan, 8: 45259 (R:US)
Research Programs
National Mirror Fusion Program Plan, 8: 45259 (R:US)
MAGNETIC MIRRORS
Including systems with minimum-B configuration.
See also BETA II DEVICES
MFTF DEVICES
OGRA
TMX DEVICES
2X DEVICES
Plasma Confinement
Particle simulations of ion-cyclotron turbulence in a mirror plasma, 8: 45161 (J:US)
MAGNETIC MONOPOLES
Collisions
Substance ionization by a superheavy monopole, 8: 45054 (TG:DE)
Mass
't Hooft—Polyakov monopole near the Prasad—Sommerfield limit, 8: 44959 (J:US)
Potential Scattering
Exact solution of the Dirac equation in the field of a 't Hooft—p Polyakov monopole, 8: 44956 (J:US)
Radiation Detection
Substance ionization by a superheavy monopole, 8: 45054 (TG:DE)
MAGNETIC SEMICONDUCTORS
Polarons
Small-polaron hopping in magnetic semiconductors, 8: 45075 (J:US)
Transport Theory
Small-polaron hopping in magnetic semiconductors, 8: 45075 (J:US)
MAGNETIC SPECTROMETERS
Image Processing
Magnetic spectrometer data handling of JINR. Data handling system and pattern recognition of events, 8: 44582 (R:SU:In Russian)
Linear Momentum Resolution
Δp/p beam particle determining in the MIS installation (JINR), 8: 44590 (R:SU:In Russian)
Optical Systems
Optical constants of magnetic spark spectrometer, 8: 44581 (R:SU:In Russian)
Spark Chambers
Optical constants of magnetic spark spectrometer, 8: 44581 (R:SU:In Russian)
MAGNETISM
See also FERROMAGNETISM
Bibliographies
Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands, 8: 44908 (R:NL)
MAGNETOHYDRODYNAMIC GENERATORS
See MHD GENERATORS
MAGNETOSHEATH
Electron Spectra
Electron velocity distributions near the earth's bow shock, 8: 44834 (J:US)
MAGNETOSPHERE
Boltzmann-Vlasov Equation
Stability of electron distributions within the earth's bow shock, 8: 44833 (J:US)
Electrons
Stability of electron distributions within the earth's bow shock, 8: 44833 (J:US)
MAHOGANY TREES
See TREES
MAIZE
Acid Hydrolysis
Process design and economics for ethanol from corn stover via dilute-acid hydrolysis: development of a base-case flowsheet for parametric analysis of acid hydrolysis processes, 8: 43453 (R:US)
Fermentation
Environmental characterization of corn-based fuel ethanol plants, 8: 43455 (BA:US)
MALIGNANCIES
See NEOPLASMS
MAN
All of mankind, of any age or of either sex.
Chemical Composition
Neutron-activation analysis in vivo, 8: 44776 (R:US)
Environmental Impacts
Theoretical analysis of the past variations in global atmospheric composition and temperature structure, 8: 44692 (R:US)
MANGANESE ALLOYS
Anisotropy
Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8: 44186 (RA:US)
Crack Propagation
Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8: 44186 (RA:US)
MANGANESE COMPOUNDS
X-Ray Spectra
EXAFS study of bromomanganate ions in molten salts, 8: 44286 (J:US)
MANPOWER
Training
Informational technology and its impact on American education, 8: 44119 (R:US)
MANUFACTURED BUILDINGS
See PREFABRICATED BUILDINGS
MANUFACTURING FACILITIES
See INDUSTRIAL PLANTS
MANURES
Aerobic Digestion
Electrochemical oxygenation of livestock wastes, 8: 43525 (J:US)
Electrolysis
Electrochemical oxygenation of livestock wastes, 8: 43525 (J:US)
MANY-BODY PROBLEM
Binding Energy
Relativistic effects in the binding energies of few-body nuclei, 8: 44969 (R:US)
Ground States
Comparison of upper and lower bound methods using a soluble many-Fermion model, 8: 45032 (J:US)
Comparison of Paris potential results for the zero and continuous particle spectrum, 8: 45033 (J:US)
Hamiltonians
Comparison of upper and lower bound methods using a soluble many-Fermion model, 8: 45032 (J:US)
Comparison of Paris potential results for the zero and continuous particle spectrum, 8: 45033 (J:US)
MAPS
Nonlinear Problems
Fractal basin boundaries, long-lived chaotic transients, and unstable-unstable pair bifurcation, 8: 45094 (J:US)

MARINE ECOSYSTEMS
See AQUATIC ECOSYSTEMS
MARS REACTOR
ICR Heating
Monte Carlo studies of tandem-mirror plasmas interacting with waves in the ion-cyclotron range of frequencies (ICRF). Progress report, April 1, 1983-June 30, 1983, 8: 45099 (R:US)
MASERS
Microwave Amplification by Stimulated Emission of Radiation.
Free electron maser for fusion applications, 8: 45211 (RA:US)
MASSACHUSETTS
Communities
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume I, 8: 44109 (R:US)
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
Energy Policy
Massachusetts Local Energy Action Program, 8: 43488 (RA:US)
MASSACHUSETTS INSTITUTE OF TECHNOLOGY ALC
See ALCATOR DEVICE
MASSLESS PARTICLES
See also NEUTRINOS
Semiclassical Approximation
Improved semiclassical approximation, 8: 45085 (J:US)
MATERIALS
See also BUILDING MATERIALS
COMPOSITE MATERIALS
DIELECTRIC MATERIALS
MAGNETIC MATERIALS
PHASE CHANGE MATERIALS
POROUS MATERIALS
POTTING MATERIALS
RADIOACTIVE MATERIALS
REACTOR MATERIALS
REINFORCED MATERIALS
SEMICONDUCTOR MATERIALS
THERMONUCLEAR REACTOR MATERIALS
TOXIC MATERIALS
Atom Transport
DIFFUSE 83, 8: 45312 (R:US)
Research Programs
Program summaries for 1982 - Energy Sciences programs, 8: 45284 (R:US)
Technology Assessment
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Technology Transfer
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
MATERIALS (ANTIFERROMAGNETIC)
See ANTIFERROMAGNETIC MATERIALS
MATERIALS (BUILDING)
See BUILDING MATERIALS
MATERIALS (COMPOSITE)
See COMPOSITE MATERIALS
MATERIALS (DIELECTRIC)
See DIELECTRIC MATERIALS
MATERIALS HANDLING EQUIPMENT
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
MATERIALS (MAGNETIC)
See MAGNETIC MATERIALS
MATERIALS (POROUS)
See POROUS MATERIALS
MATERIALS (REINFORCED)
See REINFORCED MATERIALS
MATERIALS (SEMICONDUCTOR)
See SEMICONDUCTOR MATERIALS
MATERIALS TESTING
Crack Propagation
Fatigue crack growth from blunt notches, 8: 44442 (R:DE)
MATHEMATICAL MODELS
See also COSMOLOGICAL MODELS
Matrices
Matrix formalism for uncertainty analysis, 8: 45093 (J:US)
MATRICES
Analytical Solution
Combinatorial approach to some sparse-matrix problems, 8: 45313 (R:US)
MEASLES VIRUS
Radioimmunoassay
Development and application of radioimmunoassay methods for the serodiagnosis of intrauterine and congenital virus infections, 8: 44780 (B:GB)
MEASURING INSTRUMENTS
Use of a more specific term is recommended.
See also ACCELEROMETERS
CALORIMETERS
GONIOMETERS
SPECTROMETERS
SPECTROPHOTOMETERS
THERMOCOUPLES
THERMOMETERS
Reliability
Results of instrument reliability study for high-level nuclear waste repositories, 8: 43389 (J:US)
MEAT INDUSTRY
Energy Conservation
Development of a commercial feasible application of a hydrostatic meat tenderizer and demonstration of its efficacy. Final report, June 24, 1980-March 1, 1983, 8: 44095 (R:US)
MECHANICAL STRUCTURES
See also DOMED STRUCTURES
Dynamic Loads
Lower bounds of collapse loads in axisymmetrical vessels, 8: 44380 (R:BR:In Portuguese)
Optimization of mechanical systems subjected to dynamic loadings, 8: 44379 (R:BR)
Fatigue
Method for the dimensioning of a cantileva-beam submitted to aleatory effects, 8: 44141 (R:BR:In Portuguese)
Plasticity
Lower bounds of collapse loads in axisymmetrical vessels, 8: 44380 (R:BR:In Portuguese)
Reliability
Contribution to improving reliability assessments of mechanical structural components requiring a high degree of safety using weighted Monte Carlo simulation, 8: 44446 (R:DE:In German)
Safety Engineering
Contribution to improving reliability assessments of mechanical structural components requiring a high degree of safety using weighted Monte Carlo simulation, 8: 44446 (R:DE:In German)
Stability
Stability calculations for cylindrical shells and folded systems using the method of finite elements, 8: 44392 (R:DE:In German)
MEDICAL SUPPLIES
Sterilization
Research within the coordinated programme on practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 November 1976 - 31 March 1982, 8: 44791 (R:XA)
MELANOCYTES
See ANIMAL CELLS
MELTDOWN
Pressure Gradients
Hydrogen-burn analyses of ice-condenser containments (PWR;BWR), 8: 43942 (R:US)
Temperature Gradients
Hydrogen-burn analyses of ice-condenser containments (PWR;BWR), 8: 43942 (R:US)
MEMBRANES
See also CELL MEMBRANES
Aging
Aging test results of an asphalt membrane liner, 8: 43346 (R:US)
Chemical Preparation
Preparation of permselective membranes by means of radiation induced grafting. Part of a coordinated programme on

radiation modified polymers for biomedical and biochemical applications. Final report for the period 1 August 1980 - 31 August 1982, 8: 44360 (R:XA)

MERCURY
Environmental Transport
Transport of airborne mercury emitted by coal burning into aquatic systems, 8: 43223 (RA:DK)
Toxicity
Toxicity studies of mercury in Japan, 8: 44743 (R:SE:In Swedish)

MERCURY CHLORIDES
Chemical Reactions
Phenomenological study of heterogeneous chemical reactions of mercuric chloride on heated stainless steel surfaces, 8: 44336 (J:US)

MERCURY COMPOUNDS
Qualitative Chemical Analysis
Occurrence and differentiated analysis of mercury compounds in oceanic animals, 8: 44741 (R:DE:In German)
Toxicity
Occurrence and differentiated analysis of mercury compounds in oceanic animals, 8: 44741 (R:DE:In German)

MESON FACTORIES
Experiment Planning
TRIUMF kaon factory, 8: 44480 (R:CA)

MESON-DEUTERON INTERACTIONS
See DEUTERIUM TARGET

MESONS
See also SCALAR MESONS
Mass Formulae
Meson, baryon, and glueball masses in the MIT bag model, 8: 44943 (J:US)

METAGALAXY
See UNIVERSE

METAL BUILDINGS
See PREFABRICATED BUILDINGS

METAL INDUSTRY
Electrodes
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8: 43189 (R:DE:In German)

METAL VAPOR LASERS
Kinetics
Large-bore copper-vapor lasers: Kinetics and scaling issues, 8: 44402 (J:US)
Scaling Laws
Large-bore copper-vapor lasers: Kinetics and scaling issues, 8: 44402 (J:US)

METALLURGY
Use of a more specific term is recommended; see also EXTRACTIVE METALLURGY or FABRICATION.
Research Programs
Program summaries for 1982 - Energy Sciences programs, 8: 45284 (R:US)

METALS
See also ALUMINIUM
CADMIUM
GALLIUM
GERMANIUM
LEAD
LIQUID METALS
MERCURY
RARE EARTHS
SCRAP METALS
TIN
ZINC
Atom-Atom Collisions
Effect of temperature on atom-atom collision chain length in metals, 8: 45065 (RA:SU:In Russian)
Auger Effect
Auger electrons in the energy spectra of ion-electron emission (Ni, Cu, Mo, Ta, Si, GaAs), 8: 44870 (RA:SU:In Russian)
Bibliographies
Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands, 8: 44908 (R:NL)
Crack Propagation
Fatigue crack growth theory based upon energy consideration, 8: 44183 (RA:US)
Instability
Dynamic instability in adiabatic thermoplastic shear, 8: 44196 (R:US)
Ion Collisions
Some aspects of the secondary ion emission from metals (Ti, V, Zr, Nb, Mo, Pd, Ta, W, Re, Ir, Pt), 8: 44867 (RA:SU:In Russian)
Ion Emission
Quantum theory of the emission of secondary ions from metal surfaces (Mg,Al,K,Ti,V,Cr,Fe,Co,Ni,Cu,Mo,Pd,Ag,Ta,W,Pt,Au), 8: 44864 (RA:SU)
Some aspects of the secondary ion emission from metals (Ti, V, Zr, Nb, Mo, Pd, Ta, W, Re, Ir, Pt), 8: 44867 (RA:SU:In Russian)
Lattice Vibrations
Effect of temperature on atom-atom collision chain length in metals, 8: 45065 (RA:SU:In Russian)
Removal
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Secondary Emission
Auger electrons in the energy spectra of ion-electron emission (Ni, Cu, Mo, Ta, Si, GaAs), 8: 44870 (RA:SU:In Russian)
Quantum theory of the emission of secondary ions from metal surfaces (Mg,Al,K,Ti,V,Cr,Fe,Co,Ni,Cu,Mo,Pd,Ag,Ta,W,Pt,Au), 8: 44864 (RA:SU)
Some aspects of the secondary ion emission from metals (Ti, V, Zr, Nb, Mo, Pd, Ta, W, Re, Ir, Pt), 8: 44867 (RA:SU:In Russian)
Shear
Dynamic instability in adiabatic thermoplastic shear, 8: 44196 (R:US)
Sputtering
Materials sputtering by fission fragments, 8: 44876 (RA:SU:In Russian)

METHANATION
Catalysts
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)
Flowsheets
Memphis industrial fuel gas demonstration plant (Cono-meth methanation process), 8: 43181 (RA:US)

METHANE
Biosynthesis
Kinetics and advanced digester design for anaerobic digestion of water hyacinth and primary sludge, 8: 43447 (J:US)
Breakdown
Isotope dependence of the breakdown strength of gases, 8: 44294 (J:US)
Economics
Methane drainage from coal seams by surface drillings, 8: 43188 (R:DE:In German)
Flames
Instantaneous Ramanography of a turbulent diffusion flame, 8: 44369 (J:US)
Ignition Quality
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)
Production
Anaerobic biological treatment of coal gasifier effluent, 8: 43446 (J:US)
Farm- and industrial-scale biomass fermentation studies. Annual progress report, 1 September 1980-31 December 1981, 8: 43439 (R:US)
Raman Effect
Measured stimulated Raman gain in methane, 8: 44401 (R:US)
Recovery
Demonstration project for methane recovery from unmineable coalbeds. Final report, 8: 43249 (R:US)
Methane drainage from coal seams by surface drillings, 8: 43188 (R:DE:In German)
Vyrmethane. Progress report stage 5. In situ production of methane gas from peat, 8: 43182 (R:SE:In Swedish)

METHANE HYDRATES
See GAS HYDRATES
METHANOL
Bioconversion
Acidogenic bioconversion of C_1 compounds, 8: 43522 (J:US)
Commercialization
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Cost
Production and market outlook for methanol in the 80's and 90's (Interactions of market, prices, supply and demand, imports, the uses, etc.), 8: 43450 (RA:US)
Distillation
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Ignition Quality
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)
Market
Business criteria for coal gasification, 8: 43158 (RA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Production and market outlook for methanol in the 80's and 90's (Interactions of market, prices, supply and demand, imports, the uses, etc.), 8: 43450 (RA:US)
Prices
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Production and market outlook for methanol in the 80's and 90's (Interactions of market, prices, supply and demand, imports, the uses, etc.), 8: 43450 (RA:US)
Production
Production and market outlook for methanol in the 80's and 90's (Interactions of market, prices, supply and demand, imports, the uses, etc.), 8: 43450 (RA:US)
Technical and economic assessment of emerging advanced biomass thermochemical conversion techniques, 8: 43432 (RA:US)
Utilization of the fermentor off-gases from an acetone-butanol fermentation, 8: 43470 (J:US)
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Supply and Demand
Production and market outlook for methanol in the 80's and 90's (Interactions of market, prices, supply and demand, imports, the uses, etc.), 8: 43450 (RA:US)
Synthesis
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Economic evaluation of indirect biomass liquefaction processes for production of methanol and gasoline, 8: 43456 (BA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
METHANOL PLANTS
By-Products
Business criteria for coal gasification, 8: 43158 (RA:US)
Demonstration Plants
Business criteria for coal gasification, 8: 43158 (RA:US)
Design
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Economic Analysis
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Environmental Effects
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Feasibility Studies
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Financial Incentives
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Financing
Business criteria for coal gasification, 8: 43158 (RA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Flue Gas
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Fly Ash
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Health Hazards
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Marketing Research
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)
Meetings
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Permit Applications
Business criteria for coal gasification, 8: 43158 (RA:US)
Planning
Production and market outlook for methanol in the 80's and 90's, 8: 43450 (RA:US)
Raw Materials
Production and market outlook for methanol in the 80's and 90's, 8: 43450 (RA:US)
Reliability
Business criteria for coal gasification, 8: 43158 (RA:US)
Waste Water
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
METHIONINE
Metabolism
Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine, 8: 44761 (R:FR)
METHYL ALCOHOL
See METHANOL
METHYL VIOLOGEN
See BIPYRIDINES
METHYLBENZENE
See TOLUENE
METHYL-FUEL
See ALCOHOLS
METHANOL
METHYLMERCAPTOAMINOBUTYRIC ACID
See METHIONINE
METHYLMERCURY
Toxicity
Toxicity studies of mercury in Japan, 8: 44743 (R:SE:In Swedish)
METHYLTHIOAMINOBUTYRIC ACID
See METHIONINE
METROPOLITAN AREAS
See URBAN AREAS
MFTF DEVICES
Prior to October 1977, MX DEVICES was used to index this concept.
Superconducting Magnets
Alternative connections for the large MFTF-B solenoids, 8: 45260 (R:US)
MHD GENERATORS
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

MICHIGAN
Oil Shale Deposits
Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977, 8: 43304 (R:US)
MICROBIAL PROCESSES
See ANAEROBIC DIGESTION
BIOCONVERSION
FERMENTATION
MICROCOMPUTERS
See MICROPROCESSORS
MICRONESIA
Energy Source Development
Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982, 8: 44051 (R:US)
Research Programs
Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982, 8: 44051 (R:US)
MICROPROCESSORS
Computer Networks
Local networking with intelligent nodes, 8: 45304 (R:US)
Design
Radiation-hard design principles utilized in CMOS 8085 microprocessor family, 8: 44393 (R:US)
Image Processing
Parameter choice of a special microprocessor, 8: 44583 (R:SU:In Russian)
Radiation Hardening
Radiation-hard design principles utilized in CMOS 8085 microprocessor family, 8: 44393 (R:US)
MICROSCOPES
X-Ray Equipment
X-ray microscope design study. Final report, 8: 44644 (R:US)
MICROTRONS
Beam Injection
Longitudinal phase-space matching between microtrons at 185 MeV, 8: 44513 (R:US)
Control Systems
Systems of supply and monitoring of MT-22 microtron, 8: 44540 (R:SU:In Russian)
Performance
MT-22 microtron, 8: 44547 (R:SU:In Russian)
Power Supplies
Systems of supply and monitoring of MT-22 microtron, 8: 44540 (R:SU:In Russian)
Radiation Doses
Radiation situation on the 16 MeV electron accelerator-microtron, 8: 44545 (R:SU:In Russian)
Radiation Protection
Radiation situation on the 16 MeV electron accelerator-microtron, 8: 44545 (R:SU:In Russian)
MICROWAVE AMPLIFIERS
See also MASERS
Electron Guns
Tag gun conceptualization, 8: 45206 (RA:US)
Meetings
Gyrotron user/developer meeting, 8: 45200 (R:US)
Operation
MIT gyrotron program, 8: 45207 (RA:US)
Performance
60 GHz ECH on Doublet III: 40 kW phase, 8: 45203 (RA:US)
NRL megawatt gyrotron program. Status review, 8: 45210 (RA:US)
ORNL 28-GHz user experience, 8: 45201 (RA:US)
TMX upgrade ECRH schematic, 8: 45202 (RA:US)
Varian gyrotrons in plasma experiments, 8: 45209 (RA:US)
Performance Testing
60 GHz, 200 kW, CW gyrotron development, 8: 45205 (RA:US)
Research Programs
Fusion gyrotron development status, 8: 45204 (RA:US)
Varian gyrotron programs, 8: 45208 (RA:US)
MIDDLE DISTILLATES
See PETROLEUM DISTILLATES
MIGRATION (RADIONUCLIDE)
See RADIONUCLIDE MIGRATION
MILKWEED
Feasibility Studies
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
Uses
Production of liquid fuels and chemical feedstocks from milkweed, 8: 43442 (BA:US)
MILL TAILINGS
Chemical Composition
Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings, 8: 43347 (R:US)
Environmental Impacts
Problem of abandoned uranium tailings in northern Saskatchewan. An overview, 8: 43395 (R:CA)
Leaching
Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings, 8: 43347 (R:US)
Materials Recovery
Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings, 8: 43347 (R:US)
Revegetation
Problem of abandoned uranium tailings in northern Saskatchewan. An overview, 8: 43395 (R:CA)
Stabilization
Problem of abandoned uranium tailings in northern Saskatchewan. An overview, 8: 43395 (R:CA)
MILLSTONE-1 REACTOR
Engineered Safety Systems
Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8, 8: 43757 (R:US)
Isolation Condensers
Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8, 8: 43757 (R:US)
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
LPCI
Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8, 8: 43757 (R:US)
Reactor Operation
Integrated Plant Safety Assessment: Systematic Evaluation Program. Millstone Nuclear Power Station, Unit 1, Northeast Nuclear Energy Company, Docket No. 50-245. Final report, 8: 43930 (R:US)
Reactor Safety
Integrated Plant Safety Assessment: Systematic Evaluation Program. Millstone Nuclear Power Station, Unit 1, Northeast Nuclear Energy Company, Docket No. 50-245. Final report, 8: 43930 (R:US)
RHR Systems
Interim reliability evaluation program. Analysis of the Millstone Point Unit 1 nuclear power plant. Volume III. Appendix B.5 through B.8, 8: 43757 (R:US)
MINE-MOUTH GENERATING PLANTS
See COAL MINES
FOSSIL-FUEL POWER PLANTS
MINERAL OILS
See also SHALE OIL
Neutron Dosimetry
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
MINERAL RESOURCES
See also COAL DEPOSITS
NATURAL GAS DEPOSITS
OIL SHALE DEPOSITS
PETROLEUM DEPOSITS
URANIUM DEPOSITS
Evaluation
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)

MINERALS
Chemical Analysis
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
Hydrogenation
Systematic studies on coals of different deposits, including their mineral matter, 8: 43190 (R:DE:In German)
Quantitative Chemical Analysis
Systematic studies on coals of different deposits, including their mineral matter, 8: 43190 (R:DE:In German)
Rock-Fluid Interactions
Solubility of rocks and minerals in hot water. The chemical changes of water on heat storage in caverns, 8: 43972 (R:SE:In Swedish)
Surface Properties
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
Temperature Effects
Fly ash and coal mineral matter transformations during heating, 8: 43193 (R:US)
MINERS
Stresses
Investigation of stress of man caused by work and climate in salt mining, 8: 43400 (R:DE:In German)
MINES
See also COAL MINES
Stresses
Determination of the state of stress at the Stripa Mine, Sweden, 8: 43363 (R:US)
MINING
See also COAL MINING
SURFACE MINING
UNDERGROUND MINING
Environmental Impacts
Hydrological environmental consequences of peat extraction. Preliminary study, 8: 43242 (R:SE:In Swedish)
MINING EQUIPMENT
Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
MIRROR ADVANCED REACTOR STUDY
See MARS REACTOR
MIRROR FUSION TEST FACILITY
See MFTF DEVICES
MIRRORS (MAGNETIC)
See MAGNETIC MIRRORS
MISGURNUS
See FISHES
MISSISSIPPI
Geology
Data reference and retrieval system for Richton Dome, Mississippi: annual status report for fiscal year 1982, 8: 44813 (R:US)
Mineral Resources
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)
Salt Deposits
Data reference and retrieval system for Richton Dome, Mississippi: annual status report for fiscal year 1982, 8: 44813 (R:US)
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)
Exploratory shaft conceptual design report: Gulf Interior Region salt domes (Richton, Vacherie, Cypress domes), 8: 43369 (R:US)
Preliminary overburden characterization at Richton Dome, 8: 43373 (R:US)
MOBILE HOMES
Passive Solar Cooling Systems
Passive solar mobile home project, 8: 43560 (RA:US)
Passive Solar Heating Systems
Passive solar mobile home project, 8: 43560 (RA:US)
MODELS (BIOLOGICAL)
See BIOLOGICAL MODELS
MODELS (COSMOLOGICAL)
See COSMOLOGICAL MODELS
MODELS (MATHEMATICAL)
See MATHEMATICAL MODELS
MODELS (PLASMA)
See PLASMA SIMULATION
MOLDS
See FUNGI
MOLECULAR FLUORESCENCE SPECTROSCOPY
See FLUORESCENCE SPECTROSCOPY
MOLECULAR ORBITAL MODEL
See MOLECULES
MOLECULES
Synthesis
Chiral-symmetry breaking in nonequilibrium systems, 8: 45087 (J:US)
MOLIERE THEORY
Shadow Effect
Some analytical solutions to the two atom blocking model, 8: 44858 (RA:SU)
MOLTEN CARBONATE FUEL CELLS
Prior to June 1980 this information was indexed with the descriptors HIGH-TEMPERATURE FUEL CELLS + MOLTEN SALTS + CARBONATES.
Fuel Gas
Development of a hot-gas-cleanup system for integrated coal-gasification/molten-carbonate fuel-cell power plants. Quarterly report No. 2, January 1-March 31, 1983, 8: 43173 (R:US)
Performance Testing
High-temperature molten-carbonate fuel cells. Technical progress report, January-March 1978, 8: 44055 (R:US)
MOLTEN SALT COOLANTS
See MOLTEN SALTS
MOLTEN SALTS
Surface Tension
Apparatus for the precise measurement of the physical properties of liquids at elevated temperature and pressure, 8: 44647 (J:US)
Viscosity
Apparatus for the precise measurement of the physical properties of liquids at elevated temperature and pressure, 8: 44647 (J:US)
MOLYBDENUM
Catalytic Effects
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Elasticity
Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8: 44204 (J:US)
Ion Implantation
Vacancy annealing stage in heavy ion implanted bcc metals (70 keV Xe ions), 8: 44149 (RA:SU)
Lattice Parameters
Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8: 44204 (J:US)
Physical Radiation Effects
Effect of helium on defect structure formation in molybdenum under alpha-particle irradiation, 8: 44158 (RA:SU:In Russian)
Formation of excited H by impact of H_1i, H_2^+, H_3^+ ions on metal surfaces, 8: 44145 (RA:SU)
Positron annihilation studies of molybdenum irradiated by protons, neutrons or electrons, 8: 44227 (BA:NL)
Positrons
Positron annihilation studies of molybdenum irradiated by protons, neutrons or electrons, 8: 44227 (BA:NL)
Sputtering
Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal, 8: 44865 (RA:SU)
Superlattices
Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8: 44204 (J:US)

MOLYBDENUM ALLOYS
Anisotropy
Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8: 44186 (RA:US)
Crack Propagation
Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8: 44186 (RA:US)
Ion Microscopy
Quantitative compositional analysis and field-evaporation behavior of ordered Ni_4Mo on an atomic plane-by-plane basis: an atom-probe field-ion microscope study. MSC report No. 4802, 8: 44130 (R:US)
Physical Radiation Effects
Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983, 8: 44133 (R:US)
Structural changes observed in (Mosub(.6)Rusub(.4))sub(x)Bsub(1-x) amorphous alloys observed with positron annihilation, 8: 44231 (BA:NL)
MOLYBDENUM IONS
Ionization
Electron impact ionization of highly charged molybdenum impurities in tokamak plasmas, 8: 45119 (RA:CS)
X-Ray Spectra
High-resolution x-ray spectra from molybdenum ions in the Alcator-C tokamak, 8: 44892 (J:US)
MONILIA
See CANDIDA
MONITORING
Use of a more specific term is recommended.
See also AERIAL MONITORING
AEROSOL MONITORING
BEAM MONITORING
TEMPERATURE MONITORING
Workshop reports, 8: 44004 (RA:US)
Activation Analysis
Nuclear and x-ray techniques, 8: 44662 (RA:US)
Data Analysis
Proceedings of the interagency conference on the environment, 8: 43990 (R:US)
Technology Assessment
EPA measurements and instrumentation program, 8: 43999 (RA:US)
Monitoring environmental quality, 8: 43998 (RA:US)
MONITORING (BEAM)
See BEAM MONITORING
MONITORING NETWORK
See MONITORING
MONITORS (AIR POLLUTION)
See AIR POLLUTION MONITORS
MONITORS (REACTOR)
See REACTOR CONTROL SYSTEMS
MONOCRYSTALS
Ion Channeling
Angular distribution of ions scattered by monocrystal surface semichannels, 8: 44859 (RA:SU)
MOS TRANSISTORS
Metal Oxide Silicon transistors.
Physical Radiation Effects
SNAP-BACK: a stable regenerative breakdown mode of MOS devices, 8: 44627 (R:US)
MOUTH
See ORAL CAVITY
MT ST HELENS
Eruption
Magmatic model for the Mount St. Helens blast of May 18, 1980, 8: 44816 (J:US)
Geologic Models
Magmatic model for the Mount St. Helens blast of May 18, 1980, 8: 44816 (J:US)
MULTILAMELLAR LIPID VESICLES
See LIPOSOMES
MULTIWIRE DRIFT CHAMBERS
See DRIFT CHAMBERS
MULTIWIRE PROPORTIONAL CHAMBERS
See also DRIFT CHAMBERS
Performance
Investigation of characteristics of multistep avalanche chamber, 8: 44591 (R:SU:In Russian)
MUNICIPAL BUILDINGS
See PUBLIC BUILDINGS
MUNICIPAL WASTES
Availability
Evaluation of potential for electrical generation using solid waste as fuel in the Pacific Northwest, 8: 44108 (R:US)
MUONIC ATOMS
X-Ray Spectra
Muonic x-ray measurement of the monopole and quadrupole charge parameters of /sup 154-158,160/Gd, 8: 45012 (J:US)
MUONS
See also COSMIC MUONS
MUONS MINUS
Conservation Laws
Muon-decay neutrinos and limits on neutrino oscillations, 8: 44948 (BA:US)
Oscillations
Muon-decay neutrinos and limits on neutrino oscillations, 8: 44948 (BA:US)
MUONS MINUS
Capture
Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8: 44899 (J:US)
Slowing-Down
Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8: 44899 (J:US)
MUSCLES
Neutron Dosimetry
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
MUSCULAR TISSUE
See MUSCLES
MUSEUMS
See EDUCATIONAL FACILITIES
MUTAGEN SCREENING
Chromosome aberration assays in Allium, 8: 44810 (J:NL)
Comparative Evaluations
Introduction and perspectives of plant genetic and cytogenetic assays, 8: 44808 (J:NL)
MUTAGENS
See also PROFLAVINE
Genetic Effects
Chromosome aberration assays in Allium, 8: 44810 (J:NL)
Toxicity
Chromosome aberration assays in Allium, 8: 44810 (J:NL)
MWPC
See MULTIWIRE PROPORTIONAL CHAMBERS
MX DEVICES
See MFTF DEVICES
MYOMETRIUM
See UTERUS

N

N-1470 RESONANCES
Bag Model
N/sup /(1470) in the cloudy bag model, 8: 44934 (J:US)
NAL SYNCHROTRON
See FERMILAB ACCELERATOR
NAPHTHALENE
Removal
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
NASOPHARYNX
See PHARYNX
NATIONAL ACCELERATOR LABORATORY
See FERMILAB ACCELERATOR

NATIONAL ENERGY SECURITY CORPORATION
See SYNTHETIC FUELS CORPORATION
NATIONAL GOVERNMENT
Use only when needed in conjunction with one or both of the terms LOCAL GOVERNMENT and STATE GOVERNMENT.
Energy Conservation
Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts, 8: 44026 (R:US)
NATIONAL REACTOR TESTING STATION
See IDAHO NATIONAL ENGINEERING LABORATORY
NATIONAL SYNCHROTRON LIGHT SOURCE
See NSLS
NATURAL CIRCULATION
See NATURAL CONVECTION
NATURAL CONVECTION
Computer Calculations
Slow forced and free convection in inclined channels, 8: 44415 (R:BR)
Correlations
Correlation theory for steady natural convective heat transport in horizontal annuli, 8: 44439 (J:US)
Numerical Solution
Combined free and forced laminar convection in inclined rectangular channels heated from below and cooled from above, 8: 44424 (R:BR)
Free convection between horizontal cylinders in water at low temperature, 8: 44423 (R:BR)
NATURAL GAS
Combustion
Analysis of alternative fuel price trajectories. Appendix B. Results of analysis of MFBI data using natural logarithms, 8: 43262 (R:US)
Compressibility
Correction of the AGA NX-19 mod data-processing system for real gas factors of type H natural gas (Real gas behavior of type H natural gases at pressures up to 90 bar and temperatures between -10°C and 30°C), 8: 43301 (TJ:GB)
Consumption Rates
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
Imports
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
Prices
Increased opportunities for coal in industrial markets (USA; 1930 to 1982), 8: 43265 (RA:US)
Reserves
Domestic natural gas reserves and production dedicated to interstate pipeline companies, 1982, 8: 43292 (R:US)
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
NATURAL GAS DEPOSITS
Energy Source Development
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
Exploration
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
Hydraulic Fracturing
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
Resource Assessment
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
Resource Development
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
Resource Potential
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
NATURAL GAS DISTRIBUTION SYSTEMS
Electric Potential
Power-line-induced AC potential on natural-gas-pipelines for complex rights-of-way configurations. Volume 3. Computer program user's guide. Final report, 8: 43298 (R:US)
On-Line Control Systems
Supervision and control of gas transportation and distribution systems, 8: 43300 (R:DE:In German)
Pipelines
Acoustic technique for pinpointing leaks in low-pressure gas mains, 8: 43297 (R:US)
Unsteady Flow
Computer program GANBEO, 8: 43299 (R:DE:In German)
NATURAL GAS GATHERING SYSTEMS
See NATURAL GAS DISTRIBUTION SYSTEMS
NATURAL GAS INDUSTRY
Research Programs
Support research for biomass thermal-gasification development, 8: 43422 (R:US)
NATURAL GAS PROCESSING PLANTS
Training
Energy plant process operations Curriculum-Development Project. Final technical report, 8: 43283 (R:US)
NATURAL GASOLINE PLANTS
See NATURAL GAS PROCESSING PLANTS
NATURAL LIGHTING
See DAYLIGHTING
NAVIER-STOKES EQUATION
See NAVIER-STOKES EQUATIONS
NAVIER-STOKES EQUATIONS
Numerical Solution
Number of modes governing two-dimensional viscous, incompressible flows, 8: 44910 (J:US)
NEODYMIUM LASERS
Design
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Nonlinear Optics
Second-harmonic generation in a neodymium laser by crystalline powders of organic compounds, 8: 44409 (TJ:US)
Power
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Pumping
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Reviews
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Tuning
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Uses
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
NEON 20 REACTIONS
Fragmentation
Breakup of spectator residues in relativistic nuclear collisions, 8: 45020 (J:US)
NEON IONS
Ion-Atom Collisions
Cross section of elastic scattering of ions on atoms, 8: 44843 (RA:SU)
NEOPLASMS
See also CARCINOMAS
Diagnosis
Effectiveness of testis cancer screening, 8: 44760 (R:DE:In German)

Epidemiology
Case-control study of brain tumors among white males employed at the Rocky Flats Plant, 8: 44800 (R:US)
Preventive Medicine
Effectiveness of testis cancer screening, 8: 44760 (R:DE:In German)
Radiotherapy
Radiation therapy of tumours of the central nervous system, 8: 44774 (R:PL:In Polish)
Radiation therapy of cancer of the lung, 8: 44775 (R:PL:In Polish)

NEPTUNIUM
Leaching
Neptunium concentrations in solutions contacting actinide-doped glass, 8: 43398 (J:US)
Solubility
Neptunium concentrations in solutions contacting actinide-doped glass, 8: 43398 (J:US)

NEPTUNIUM 235
Electron Capture Decay
Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8: 45025 (J:US)

NEPTUNIUM 236
Electron Capture Decay
Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8: 45025 (J:US)

NEPTUNIUM 237
Energy Levels
Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8: 45025 (J:US)

NETHERLANDS
Coal Mining
Coal exploration in the Netherlands. A research proposal, 8: 43243 (R:NL:In Dutch)
Data
Electric power production data bank: construction and some details, 8: 44043 (R:NL:In Dutch)
Employment
Energy prices and employment, 8: 43988 (R:NL:In Dutch)
Energy Consumption
Industrial fuel use in relation to temperature, 8: 44046 (R:NL:In Dutch)
Energy Expenses
Energy prices and employment, 8: 43988 (R:NL:In Dutch)
Energy Policy
Energy conservation in buildings, 8: 44077 (R:NL:In Dutch)
Energy Supplies
Description of SELPE, a model of the Dutch energy supply, 8: 44030 (R:NL:In Dutch)
Determination of environment parameters for SELPE, a model for energy supply, 8: 43984 (R:NL:In Dutch)
Flywheel Energy Storage
Proposed coordinated research program of energy storage in flywheels. Project preparation group 'Flywheels', 8: 43970 (R:NL:In Dutch)
Power Generation
Electric power production data bank: construction and some details, 8: 44043 (R:NL:In Dutch)
Solar Energy
National Research Program Solar Energy. Progress report for the period ending 30 June 1979, 8: 43478 (R:NL:In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1980, 8: 43544 (R:NL:In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1981, 8: 43545 (R:NL:In Dutch)
The National Research Program Solar Energy. Project overview first phase (1978-1981), 8: 43477 (R:NL:In Dutch)
Wind Power
National development program Wind energy. Proposal for the years 1981 to 1990, 8: 43667 (R:NL:In Dutch)
Perspectives for wind energy in the Netherlands. National research programme 1976-1981. Results and recommendations, 8: 43666 (R:NL:In Dutch)
Wind energy in the Netherlands, 8: 43668 (R:NL)

NETWORKS (COMPUTER)
See COMPUTER NETWORKS

NEUTRAL BEAM SOURCES
Beam Neutralization
Design of pumped neutralizers for neutral beams using Monte Carlo methods, 8: 45276 (J:US)
Cryogenics
Cryogenics for neutral beam testing, 8: 45275 (BA:US)
Cryopumps
Cryopump operations with the tokamak neutral beam injector prototype, 8: 45274 (BA:US)

NEUTRAL-PARTICLE TRANSPORT
See also ATOM TRANSPORT
Monte Carlo Method
Design of pumped neutralizers for neutral beams using Monte Carlo methods, 8: 45276 (J:US)
Monte Carlo calculation of neutral transport in Tokamaks, 8: 45196 (J:US)

NEUTRINO DETECTION
Cryogenic Bubble Chambers
Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber, 8: 44578 (R:SU:In Russian)
Nuclear Emulsions
Vertex localization for neutrino interactions in nuclear emulsion placed inside a 15-ft bubble chamber, 8: 44578 (R:SU:In Russian)

NEUTRINO-ELECTRON INTERACTIONS
Elastic Scattering
Elastic neutrino-electron scattering: a progress report on Exp734 at Brookhaven, 8: 44912 (R:US)
Scattering
Survey of nu/sub μ/e physics with emphasis on recent Fermilab results, 8: 44921 (R:US)

NEUTRINOS
Leptonic Decay
Cosmological bounds on heavy neutrinos through the decays νsub(H)->3νsub(L) and νsub(H)->νsub(L)γ, 8: 44946 (J:NL)
Oscillations
Muon-decay neutrinos and limits on neutrino oscillations, 8: 44948 (BA:US)
Radiative Decay
Cosmological bounds on heavy neutrinos through the decays νsub(H)->3νsub(L) and νsub(H)->νsub(L)γ, 8: 44946 (J:NL)
Rest Mass
Massive, degenerate neutrinos and cosmology, 8: 44829 (J:US)

NEUTRON ACTIVATION ANALYSIS
See ACTIVATION ANALYSIS
NEUTRON REACTIONS

NEUTRON BEAMS
Energy Losses
Atomic and nuclear properties of materials, 8: 45048 (R:DE)

NEUTRON CAPTURE
See NEUTRON REACTIONS

NEUTRON DETECTION
Solid Scintillation Detectors
Neutron scintillation detector for the time-of-flight spectrometry, 8: 44592 (R:SU:In Russian)

NEUTRON DETECTORS
See also FISSION FOIL DETECTORS
PROTON RECOIL DETECTORS
Instrument to detect vapor-nucleation in superheated liquid, 8: 44567 (R:US)
Investigations on the applicability of superheated drop detectors in neutron dosimetry, 8: 44568 (R:US)

NEUTRON DIFFRACTOMETERS
Manuals
Write-up for the diffractometer D1 at Risoe, 8: 44640 (R:DK)

NEUTRON DIFFUSION EQUATION
Computer Codes
UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems, 8: 45057 (TG:US)
Numerical Solution
UNIMUG: a program for the solution of multigroup diffusion equations in one-dimensional systems, 8: 45057 (TG:US)

NEUTRON DOSIMETRY
Investigations on the applicability of superheated drop detectors in neutron dosimetry, 8: 44568 (R:US)
Neutron spectral characterization of the fourth Nuclear Regulatory Commission Heavy Section Steel Technology IT-CT irradiation experiments: dosimetry and uncertainty analysis, 8: 43786 (R:US)
Depth Dose Distributions
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
Ionization Chambers
New look at displacement factor and point of measurement corrections in ionization chamber dosimetry, 8: 45062 (J:US)
Plastic Scintillation Detectors
Study on the high-energy neutron fluence and dose rate meter response, 8: 44597 (R:SU:In Russian)
Radiation Doses
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
S Codes
Project "REMAD", Neutron spectrometry. Code "SOHO - phase II". First part "FORMULATION", 8: 44565 (R:FR:In French)
Thermoluminescent Dosemeters
Investigation of thermal neutron sensitivity of LiF-TL detectors for routine personnel dosimetry at the thermal column of the ZR-4 reactor, 8: 44609 (R:HU:In Hungarian)
NEUTRON MATTER
See NUCLEAR MATTER
NEUTRON REACTIONS
Capture
Average resonance capture studies of /sup 162,164/Dy, 8: 45011 (J:US)
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8: 44977 (R:US)
Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry, 8: 45022 (J:US)
Charge-Exchange Reactions
Analysis of the recommended threshold reaction cross sections from the BOSPOR-80 library using integral experiment data, 8: 44995 (RA:SU:In Russian)
Elastic Scattering
Calculation of the energy-averaged scattering function from high resolution low-energy neutron scattering data, 8: 44990 (J:US)
Neutron elastic scattering in the energy region 1.5 to 4.0 MeV for radiogenic lead and bismuth, 8: 45015 (R:SE)
Structure of ^{12}B from measurement and R-matrix analysis of sigma(theta) for ^{11}B(n,n)^{11}B and ^{11}B(n,n')^{11}Bsup(*)(2.12 MeV), and shell-model calculations, 8: 44988 (J:NL)
Fission
Mass distributions in monoenergetic-neutron-induced fission of ^{239}Pu, 8: 45024 (J:US)
Inelastic Scattering
Structure of ^{12}B from measurement and R-matrix analysis of sigma(theta) for ^{11}B(n,n)^{11}B and ^{11}B(n,n')^{11}Bsup(*)(2.12 MeV), and shell-model calculations, 8: 44988 (J:NL)
NEUTRON SOURCES
Excludes reactors even when used as neutron sources.
Group Constants
Ensuring by multigroup constants for calculations of photoneutron sources, 8: 45002 (R:SU:In Russian)
Spallation
Rutherford SNS beam experiments, 8: 44527 (RA:DE)
NEUTRON SPECTROMETERS
Energy Resolution
High resolution energy analysers for the 'High Throughput Inelastic Spectrometer', 8: 44622 (R:GB)
Pulse Analyzers
Two-parameter "Time-detector's number" analyzer based on a minicomputer for the KDSOG-M neutron spectrometer, 8: 44595 (R:SU:In Russian)
NEUTRON STARS
Meetings
Accreting neutron stars, 8: 44825 (R:BG)
NEUTRON TRANSPORT THEORY
Monte Carlo Method
Overview of the use of Monte Carlo methods in controlled thermonuclear fusion research, 8: 45194 (J:US)
NEUTRONS
See also SLOW NEUTRONS
THERMAL NEUTRONS
Depth Dose Distributions
New look at displacement factor and point of measurement corrections in ionization chamber dosimetry, 8: 45062 (J:US)
Spin Orientation
Measurement of parity non-conserving neutron spin rotation in lead and tin, 8: 45053 (J:NL)
NEVADA
Geothermal Fields
Electromagnetic soundings over a geothermal reservoir in Dixie Valley, Nevada, 8: 43656 (R:US)
Resistivity Surveys
Electromagnetic soundings over a geothermal reservoir in Dixie Valley, Nevada, 8: 43656 (R:US)
NEVADA TEST SITE
Geologic History
Geological reconnaissance and chronologic studies. Technical report No. 33, 8: 44712 (R:US)
Geology
Geological reconnaissance and chronologic studies. Technical report No. 33, 8: 44712 (R:US)
Land Use
Economic potential of alternative land and natural resource uses at the Nevada Test Site, Nye County, Nevada, 8: 44721 (R:US)
Radiation Monitoring
Community-monitoring program surrounding the Nevada Test Site: one year of experience, 8: 44696 (R:US)
Radioactive Waste Disposal
Geotechnical instrumentation requirements for atdepth testing and repository monitoring in tuff, 8: 43388 (J:US)
Resource Assessment
Economic potential of alternative land and natural resource uses at the Nevada Test Site, Nye County, Nevada, 8: 44721 (R:US)
Screening
Evaluation of geochemical properties used in area-to-location screening for a nuclear waste repository at the Nevada Test Site, 8: 43357 (R:US)
Seismicity
Preliminary review and summary of the potential for tectonic, seismic, and volcanic activity at the Nevada Test Site defense waste disposal site, 8: 43343 (R:US)
Status of volcanic hazard studies for the Nevada Nuclear Waste Storage Investigations, 8: 43356 (R:US)
Soil Chemistry
Relations between soil chemistry and moisture movement, 8: 44711 (R:US)
Tectonics
Preliminary review and summary of the potential for tectonic, seismic, and volcanic activity at the Nevada Test Site defense waste disposal site, 8: 43343 (R:US)
Volcanism
Preliminary review and summary of the potential for tectonic, seismic, and volcanic activity at the Nevada Test Site defense waste disposal site, 8: 43343 (R:US)
Status of volcanic hazard studies for the Nevada Nuclear Waste Storage Investigations, 8: 43356 (R:US)
NEW MEXICO
Evaporites
Petrographic study of evaporite deformation near the Waste Isolation Pilot Plant (WIPP), 8: 43385 (R:US)
Geothermal Energy
Consumer-behavorial analysis of alternate-energy adoption: the case of geothermal energy in New Mexico. Final report, 6/1/80-8/1/81, 8: 43661 (R:US)
Uranium Minerals
Investigation of sedimentary, mineralogical, chemical, and color patterns and associations in the Rio de Oro mine,

McKinley County, New Mexico. National Uranium Resource Evaluation, 8: 43325 (R:US)
Uranium Mines
Investigation of sedimentary, mineralogical, chemical, and color patterns and associations in the Rio de Oro mine, McKinley County, New Mexico. National Uranium Resource Evaluation, 8: 43325 (R:US)
NEW YORK
Coal Deposits
State of New York peat-resource inventory. Volume II, 8: 43246 (R:US)
NEW ZEALAND
Energy Analysis
Total energy requirements of shopping for food (Supermarkets, Grocery Stores, Dairies, Butcheries, New Zealand), 8: 44048 (R:NZ)
Total energy requirements of food retailing (Grocery Stores, Supermarkets, Dairies, Butcheries, New Zealand), 8: 44047 (R:NZ)
NIAGARA RIVER
Fouling
Mitigation of biofouling using coatings - year 3. Quarterly progress report No. 3, 8: 44726 (R:US)
NICKEL
Auger Effect
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Autoionization
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Cathode Sputtering
Influence of surface microstructure on cathode sputtering of metals in the near threshold energy range, 8: 44851 (RA:SU:In Russian)
Charged-Particle Transport
Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8: 45041 (RA:DE)
Chemical Activation
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8: 44349 (R:US)
Crystal Defects
Damaging channeling, 8: 44157 (RA:SU:In Russian)
Elasticity
Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8: 44204 (J:US)
Electrodeposition
Electrochemical behavior of a pyrophosphate-borohydride electroless nickel plating bath, 8: 44237 (TJ:US)
Electron Collisions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Electron Diffraction
Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8: 44218 (J:US)
Energy-Level Transitions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Interatomic Distances
Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8: 44218 (J:US)
Ion Collisions
Computer simulation of the grazing incidence backscattering of protons from a (110) nickel surface, 8: 44860 (RA:SU)
Lattice Parameters
Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8: 44218 (J:US)
Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8: 44204 (J:US)
Physical Radiation Effects
Radiation hardening and creep of metals, 8: 44163 (RA:SU:In Russian)
Specific features of dislocation loop formation under a pulsed high-current beam irradiation, 8: 44160 (RA:SU:In Russian)
Proton Channeling
Influence of surface contamination on energy distribution of surface channeled ions (150 keV protons), 8: 44143 (RA:SU)
Sorptive Properties
Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8: 44218 (J:US)
Sputtering
Comparative studies of the energy distribution of neutral atoms sputtered from a NiW-alloy and from elemental Ni and W by 2.5 keV Ar^+ ions, 8: 44848 (RA:SU)
Effects of O_2 addition on the growth of columnar shadowing defects in sputtered Ni, 8: 44194 (R:US)
Ion bombardment induced evolution of inert gases trapped in solids, 8: 44874 (RA:SU)
Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal, 8: 44865 (RA:SU)
Superlattices
Structural, elastic, and transport anomalies in molybdenum/nickel superlattices, 8: 44204 (J:US)
Surface Properties
Reemitted-positron energy-loss spectroscopy: A novel probe of adsorbate vibrational levels, 8: 44304 (J:US)
Studies of physical-chemical processes on surface of metals and semiconductors by the method of secondary ion mass spectroscopy, 8: 44144 (RA:SU:In Russian)
NICKEL 58 TARGET
Neutron Reactions
Analysis of the recommended threshold reaction cross sections from the BOSPOR-80 library using integral experiment data, 8: 44995 (RA:SU:In Russian)
NICKEL ALLOYS
See also CHROMIUM-NICKEL STEELS
NICKEL BASE ALLOYS
Amorphous State
Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g), 8: 44232 (BA:NL)
Anisotropy
Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8: 44186 (RA:US)
Crack Propagation
Directionality effect on fatigue crack growth rate for forged 20 MnMoNi55 (A 508 Cl 3) material, 8: 44186 (RA:US)
Deposition
Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings, 8: 44238 (TJ:US)
Sputtering
Comparative studies of the energy distribution of neutral atoms sputtered from a NiW-alloy and from elemental Ni and W by 2.5 keV Ar^+ ions, 8: 44848 (RA:SU)
NICKEL BASE ALLOYS
See also INCONEL ALLOYS
Annealing
Helium effect on the dislocation network structure in a high-nickel alloy, 8: 44161 (RA:SU:In Russian)
Crystal Defects
Investigations of defective β-NiAl by transmission electron microscopy, 8: 44234 (BA:US)
Dislocations
Helium effect on the dislocation network structure in a high-nickel alloy, 8: 44161 (RA:SU:In Russian)
Electrodeposition
Galvanic dispersion coatings increase the service life of tools used in plastic processing, 8: 44236 (TJ:US)
Ion Microscopy
Quantitative compositional analysis and field-evaporation behavior of ordered Ni_4Mo on an atomic plane-by-plane basis: an atom-probe field-ion microscope study. MSC report No. 4802, 8: 44130 (R:US)
Mechanical Properties
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Metallography
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

Physical Radiation Effects
Helium effect on the dislocation network structure in a high-nickel alloy, 8: 44161 (RA:SU:In Russian)
Vacancies
Positron annihilation measurements of vacancy formation in Ni and Ni(Ge), 8: 44230 (BA:NL)

NICKEL COMPLEXES
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)

NICKEL IONS
Channeling
Damaging channeling, 8: 44157 (RA:SU:In Russian)
Ion Channeling
Damaging channeling, 8: 44157 (RA:SU:In Russian)

NICKEL OXIDES
Vacancies
Concerning the trapping of positrons in ionic solids, 8: 44318 (BA:NL)

NIOBIUM
Ion Exchange Chromatography
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B:DE:In German)
Physical Radiation Effects
Radiation blistering of Nb implanted with helium ions of energies expected in the fusion reactor, 8: 44150 (RA:SU:In Russian)
Surface effects in fusion device operation, 8: 44151 (RA:SU)
Slip
Selection of slip systems in low-temperaure deformation of niobium, 8: 44128 (R:US)
Sorptive Properties
Site determination for palladium on niobium using angle-resolved photoemission, 8: 44217 (J:US)
Superconductivity
Investigation of real niobium surfaces by rf-measurements between 12 and 18GHz, 8: 44389 (R:DE:In German)

NIOBIUM ALLOYS
See also INCONEL 600
Physical Radiation Effects
Effects of self-annealing and reirradiation on the specific heat of Nb_3Al, 8: 44222 (J:US)

NIOBIUM COMPOUNDS
Electronic Specific Heat
Electronic density of states and T/sub c/ in Nb_3Sn under pressure, 8: 44226 (J:US)
Transition Temperature
Electronic density of states and T/sub c/ in Nb_3Sn under pressure, 8: 44226 (J:US)

NITRATES
See also SODIUM NITRATES
URANYL NITRATES
Aerosol Monitoring
Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling, 8: 44675 (RA:DE)
Plumes
Ground-water surveillance at the Hanford Site for CY 1982, 8: 44748 (R:US)

NITRIC ACID
New approach to the determination of atmospheric strong acids, 8: 44670 (RA:DE)
Chemical Reactions
Studies on the reaction of nitric acid and sugar, 8: 44354 (J:US)

NITRIC OXIDE
NO.
Chemical Reaction Kinetics
Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8: 44659 (R:US)
Chemical Reactions
Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8: 44659 (R:US)

NITRITES
Specific compounds should be indexed by coordination of a descriptor of the form (CATION) COMPOUNDS and the above anion descriptor.
Crystal Lattices
Calculation of the SHG coefficients of $NaNO_2$ crystals by using CNDO/S method, 8: 44344 (TJ:US)
Electronic Structure
Calculation of the SHG coefficients of $NaNO_2$ crystals by using CNDO/S method, 8: 44344 (TJ:US)

NITROGEN
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
Breakdown
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Emission Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Equations of State
Effective spherical potentials for molecular fluid thermodynamics, 8: 44303 (J:US)
Laser-Radiation Heating
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Potentials
Effective spherical potentials for molecular fluid thermodynamics, 8: 44303 (J:US)
Removal
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Thermodynamic Properties
Effective spherical potentials for molecular fluid thermodynamics, 8: 44303 (J:US)
Visible Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)

NITROGEN 14
Yrast States
Inelastic scattering of 162-MeV pions by ^{14}N, 8: 44985 (J:US)

NITROGEN 14 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)

NITROGEN 14 TARGET
Pion Reactions
Inelastic scattering of 162-MeV pions by ^{14}N, 8: 44985 (J:US)

NITROGEN 15 TARGET
Proton Reactions
Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations, 8: 44978 (J:US)

NITROGEN NITRIDES
See NITROGEN

NITROGEN OXIDES
See also NITRIC OXIDE
Air Pollution Control
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Ecological Concentration
Effect of future centralized heating in Oslo on air quality. Pt. 1, 8: 44708 (R:NO:In Norwegian)
Removal
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)

NITROSO COMPOUNDS
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)

NOISE POLLUTION
Environmental standards, 8: 43993 (RA:US)

NON-EQUILIBRIUM PLASMA
Energy Levels
Helium population model, 8: 45136 (RA:CS)

Plasma Diagnostics
Diagnostics of nonequilibrium hydrogen plasma, 8: 45131 (RA:CS)
NONLINEAR PLASMA INSTABILITIES
See PARAMETRIC INSTABILITIES
NON-PROLIFERATION TREATY
International non-proliferation regime. An historical overview, 8: 43403 (RA:CA)
NONRADIOACTIVE WASTE DISPOSAL
See WASTE DISPOSAL
NONRADIOACTIVE WASTES
See GASEOUS WASTES
LIQUID WASTES
SOLID WASTES
NORTH AMERICA
See also CANADA
USA
Fertilizers
Fertilizer trends 1982, 8: 44009 (R:US)
NORWAY
Air Quality
Effect of future centralized heating in Oslo on air quality. Pt. 1, 8: 44708 (R:NO:In Norwegian)
NOS. 4, 5, AND 6 FUEL OILS
See RESIDUAL FUELS
NOS. 5 AND 6 BURNER OILS
See RESIDUAL FUELS
NOVA FACILITY
Control Systems
Uses of ORACLE in the Nova Laser Control System, 8: 45264 (R:US)
NOZZLES
Crack Propagation
Crack initiation and crack growth at the inner nozzle corner surface under thermal shock loading, 8: 44191 (RA:US)
Thermal fatigue crack growth analysis in a nozzle corner, 8: 44192 (RA:US)
Thermal Fatigue
Thermal fatigue crack growth analysis in a nozzle corner, 8: 44192 (RA:US)
Thermal Shock
Crack initiation and crack growth at the inner nozzle corner surface under thermal shock loading, 8: 44191 (RA:US)
NRTS
See IDAHO NATIONAL ENGINEERING LABORATORY
NSLS
Accelerator Facilities
Construction and maintenance of SUNY facilities at the National Synchrotron Light Source. Progress report, 1 July 1982-1 July 1983, 8: 44514 (R:US)
Research Programs
Construction and maintenance of SUNY facilities at the National Synchrotron Light Source. Progress report, 1 July 1982-1 July 1983, 8: 44514 (R:US)
Research on surface physics and crystallography at NSLS. Technical progress report, 1 November 1982-31 October 1983, 8: 45063 (R:US)
NUCLEAR CONTROVERSY
See HUMAN POPULATIONS
NUCLEAR DATA COLLECTIONS
1982 Recent References (Cumulation), 8: 44968 (J:US)
Analysis of the recommended threshold reaction cross sections from the BOSPOR-80 library using integral experiment data, 8: 44995 (RA:SU:In Russian)
Comparative Evaluations
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8: 43842 (R:XA)
Data Processing
Preparation of the constant library in the NEKTAR-M program using the files of evaluated neutron data, 8: 43790 (R:SU:In Russian)
NUCLEAR EMULSIONS
Iron 56 Reactions
Anomalous reaction mean free paths of nuclear projectile fragments from heavy ion collisions at 2A GeV, 8: 44982 (J:US)
Oxygen 16 Reactions
Anomalous reaction mean free paths of nuclear projectile fragments from heavy ion collisions at 2A GeV, 8: 44982 (J:US)
Particle Tracks
Calendar of high multiplicity ^{12}C induced reactions in Ag (Br), 8: 45000 (R:SE)
NUCLEAR ENERGY
Coordinated Research Programs
Annual report 1981, 8: 44012 (R:NL:In Dutch)
Process Heat
AECL programs for new applications for nuclear energy, 8: 43832 (R:CA)
Uses
AECL programs for new applications for nuclear energy, 8: 43832 (R:CA)
NUCLEAR ENGINEERING
Computer Graphics
Data Analysis through a Generalized Interactive Computer Animation Method (DATICAM), 8: 45290 (R:US)
NUCLEAR FACILITIES
See also FEED MATERIALS PLANTS
FUEL FABRICATION PLANTS
FUEL REPROCESSING PLANTS
NUCLEAR POWER PLANTS
RADIOACTIVE WASTE FACILITIES
Criticality
Nuclear-fuel-cycle education: Module 6. Criticality safety, 8: 43401 (R:US)
Decommissioning
Final Environmental Statement related to the decommissioning of the Rare Earths Facility, West Chicago, Illinois. Docket No. 40-2061, 8: 44756 (R:US)
Licensing
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 2. Functional modules, 8: 43409 (R:US)
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 1. Control modules, 8: 43408 (R:US)
Radiation Monitoring
Aerosols in nuclear engineering, 8: 44701 (RA:DE:In German)
Safety
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 1. Control modules, 8: 43408 (R:US)
NUCLEAR FUEL ELEMENTS
See FUEL ELEMENTS
NUCLEAR FUELS
See also SPENT FUELS
Government Policies
Nuclear policy review background papers, 8: 44018 (R:CA)
Porosity
Characterization of nuclear fuel aerosol by sedimentation, 8: 44702 (RA:DE)
NUCLEAR INDUSTRY
Computer Codes
Quantitative software reliability analysis in nuclear safety, 8: 43960 (BA:US)
Quality Assurance
Managerial attitude toward quality assurance, 8: 43744 (R:US)
NUCLEAR MATERIALS DIVERSION
Detection
MC and A reform amendment: variance estimates and performance evaluation, 8: 43410 (R:US)
Sample size optimization in nuclear material control. 1. Random sampling for the variables test, 8: 43411 (R:DD:In German)
Sample size optimization in nuclear material control. 2. Random sampling for the attribute test, 8: 43412 (R:DD:In German)
NUCLEAR MATERIALS MANAGEMENT
Nuclear-fuel-cycle education: Module 9. Safeguards, 8: 43402 (R:US)
Control Equipment
Safeguards instrumentation: past, present, future, 8: 43414 (J:US)

Inventories
Data-acquisition system for the NLO error-propagation exercise, 8: 43407 (R:US)
Measuring Instruments
Safeguards instrumentation: past, present, future, 8: 43414 (J:US)
Safeguards
Sample size optimization in nuclear material control. 1. Random sampling for the variables test, 8: 43411 (R:DD:In German)
Sample size optimization in nuclear material control. 2. Random sampling for the attribute test, 8: 43412 (R:DD:In German)
Sampling
Sample size optimization in nuclear material control. 1. Random sampling for the variables test, 8: 43411 (R:DD:In German)
Sample size optimization in nuclear material control. 2. Random sampling for the attribute test, 8: 43412 (R:DD:In German)
Security
Annual progress report 1981, 8: 43404 (R:FR:In French)
Surveillance
Real-time inventory system for special nuclear material in storage, 8: 43406 (R:US)

NUCLEAR MATTER
Field Theories
Systematics of nuclear matter properties in a non-linear relativistic field theory, 8: 45039 (J:NL)

NUCLEAR MEDICINE
Research Programs
Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8: 44767 (R:US)
Technetium 99
Application of technetium-99m-phosphate isomers in nuclear medicine. A comparative study, 8: 44779 (B:ZA:In Afrikaans)

NUCLEAR PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text books, etc.
Computer Graphics
Data Analysis through a Generalized Interactive Computer Animation Method (DATICAM), 8: 45290 (R:US)

NUCLEAR POTENTIAL
Axial-Vector Currents
Classification of exchange currents, 8: 45031 (J:US)
Vector Currents
Classification of exchange currents, 8: 45031 (J:US)

NUCLEAR POWER PLANTS
Alarm Systems
Probabilistic approach in selecting the serviced area for public radiation alarm systems in the vicinity of nuclear power plants, 8: 43963 (BA:US)
Construction
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Construction Permits
Nuclear power plants. Legal aspects - installation - construction - operation, 8: 44023 (R:BR:In Portuguese)
Containment Buildings
Consensus estimation study of nuclear power plant structural loads, 8: 43944 (R:US)
First-excursion problems for Gaussian vector processes, 8: 43943 (R:US)
Cost
Program reference book for the Energy Economic Data Base Program (EEDB), 8: 43828 (R:US)
Economics
Energy Economic Data Base Program (EEDB). Phase V update (1982) report, 8: 43827 (R:US)
Emergency Plans
Probabilistic approach in selecting the serviced area for public radiation alarm systems in the vicinity of nuclear power plants, 8: 43963 (BA:US)
Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation, 8: 43948 (R:US)
Engineered Safety Systems
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Environmental Impacts
Sensitivity analysis of the meteorological model applied in the German risk study (DRS), 8: 43878 (BA:US)
Inspection
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Operating Cost
Calculation method of the power generation costs of a nuclear power plant, 8: 44019 (R:NL:In Dutch)
Operating Licenses
Nuclear power plants. Legal aspects - installation - construction - operation, 8: 44023 (R:BR:In Portuguese)
Pipes
Design and analysis for piping systems, 8: 43856 (R:BR)
Nuclear power plant piping damping parametric effects, 8: 43907 (R:US)
Public Opinion
Nuclear energy and its public acceptance in Japan, 8: 44020 (R:BE:In French)
Nuclear power attitude trends, 8: 43949 (R:US)
Quality Assurance
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Managerial attitude toward quality assurance, 8: 43744 (R:US)
Reactor Accidents
Applications of nuclear accident consequence models, 8: 43962 (BA:US)
Methodology and practical basis for emergency planning in case of accidental releases, 8: 43880 (BA:US)
Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department, 8: 43881 (BA:US)
Reactor Components
Consensus estimation study of nuclear power plant structural loads, 8: 43944 (R:US)
First-excursion problems for Gaussian vector processes, 8: 43943 (R:US)
Probability problems in seismic risk analysis and load combinations for nuclear power plants, 8: 43952 (R:US)
Reactor Control Systems
Microprocessor-based power control data acquisition system, 8: 43872 (R:IL:In Hebrew)
Reactor Licensing
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Nuclear Regulatory Commission Issuances. Volume 16, No. 3, 8: 43824 (R:US)
Probabilistic safety analysis : a new nuclear power plants licensing method, 8: 43953 (R:BR:In Portuguese)
Prospects and opportunities for nuclear power regulatory reform, 8: 43825 (R:US)
Regulatory licensing status summary report. Nuclear power plants data for decisions (Blue Book), June 1-June 30, 1983, 8: 43823 (R:US)
Reactor Maintenance
The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory, 8: 43956 (BA:US)
Reactor Operation
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Reactor Operators
Fault trees and the impact of human variability on probabilistic risk analysis, 8: 43901 (R:US)
Reactor Protection Systems
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)

Reactor Safety
Generic nuclear safety issues: methods and examples, 8: 43959 (BA:US)
Institutional implications of establishing safety goals for nuclear power plants, 8: 43940 (R:US)
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Probabilistic safety analysis : a new nuclear power plants licensing method, 8: 43953 (R:BR:In Portuguese)
Reactor Sites
Methodology and practical basis for emergency planning in case of accidental releases, 8: 43880 (BA:US)
Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation, 8: 43948 (R:US)
Reliability
System reliability engineering in the Swedish nuclear regulatory process, 8: 43957 (BA:US)
Risk Assessment
Fault trees and the impact of human variability on probabilistic risk analysis, 8: 43901 (R:US)
Generic nuclear safety issues: methods and examples, 8: 43959 (BA:US)
Probabilistic safety analysis : a new nuclear power plants licensing method, 8: 43953 (R:BR:In Portuguese)
Probabilistic approach in selecting the serviced area for public radiation alarm systems in the vicinity of nuclear power plants, 8: 43963 (BA:US)
Sensitivity analysis of the meteorological model applied in the German risk study (DRS), 8: 43878 (BA:US)
System reliability engineering in the Swedish nuclear regulatory process, 8: 43957 (BA:US)
Site Selection
Measurement of in situ dynamic properties in relation to geologic conditions, 8: 43882 (J:US)
Nuclear energy and its public acceptance in Japan, 8: 44020 (R:BE:In French)
Sandia nuclear power plant siting study, 8: 43961 (BA:US)
Thermoluminescent Dosimetry
General approach to assure compliance with ALARA guidelines on direct radiation from a nuclear power plant, January 1979-January 1982, 8: 43936 (R:US)

NUCLEAR POWER STATIONS
See NUCLEAR POWER PLANTS

NUCLEAR REACTIONS
See also FISSION
HADRON REACTIONS
LEPTON REACTIONS
PHOTONUCLEAR REACTIONS
THERMONUCLEAR REACTIONS
Nuclear Data Collections
1982 Recent References (Cumulation), 8: 44968 (J:US)

NUCLEAR SAFETY
See RADIATION PROTECTION

NUCLEAR WEAPONS PROLIFERATION
See PROLIFERATION

NUCLEI
See also HYPERNUCLEI
LIGHT NUCLEI
Nuclear Data Collections
1982 Recent References (Cumulation), 8: 44968 (J:US)

NUCLEOGENESIS
See NUCLEOSYNTHESIS

NUCLEON-ANTINUCLEON INTERACTIONS
See also PROTON-ANTIPROTON INTERACTIONS
OBE Model
Meson theory of low-energy elastic nucleon-antinucleon scattering, 8: 44929 (R:AT:In German)
Strong Interactions
Meson theory of low-energy elastic nucleon-antinucleon scattering, 8: 44929 (R:AT:In German)

NUCLEOSYNTHESIS
See also THERMONUCLEAR REACTIONS
Cross Sections
Charged particle reaction cross sections and nucleosynthesis, 8: 44827 (R:AU)

O

O GROUPS
Irreducible Representations
Missing label operators in the reduction O(p)arrow-downO(p-2) x O(2), 8: 45092 (J:US)

OAK RIDGE RESEARCH REACTOR
See ORR REACTOR

OCEAN THERMAL POWER PLANTS
Closed-Cycle Systems
Ocean thermal-energy-conversion power-system development. Phase I. Preliminary design report. Volume II. Appendixes A, B, and C, 8: 43543 (R:US)
Research Programs
Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary, 8: 43541 (R:US)

OCEANS
See SEAS

OCTANE
Combustion
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)

OFFICE BUILDINGS
Atria
Princeton Professional Park (PPP): design for heating, cooling, and daylighting, 8: 43606 (RA:US)
Daylighting
Princeton Professional Park (PPP): design for heating, cooling, and daylighting, 8: 43606 (RA:US)
Passive Solar Cooling Systems
Princeton Professional Park (PPP): design for heating, cooling, and daylighting, 8: 43606 (RA:US)
Passive Solar Heating Systems
Passive solar retrofit of all-glass office buildings, 8: 43595 (RA:US)
Princeton Professional Park (PPP): design for heating, cooling, and daylighting, 8: 43606 (RA:US)

OFFSHORE DRILLING
Blowouts
Well control in case of offshore blowout. Diversion, 8: 43278 (R:NO)
Risk Assessment
Well control in case of offshore blowout. Mechanized drill pipe handling, stabbing, stripping/snubbing, drill string telemetry and mud monitoring, better BOP, 8: 43280 (R:NO)

OFFSHORE PLATFORMS
Includes gravity or fixed, floating, and towed platforms.
Safety
Well control in case of offshore blowout. Diversion, 8: 43278 (R:NO)

OGRA
Flute Instability
Experimental study on flute oscillations in an open trap with magnetic field minimum, 8: 45106 (R:SU:In Russian)

OHMIC PLASMA HEATING
See JOULE HEATING

OHMIC RESISTANCE
See ELECTRIC CONDUCTIVITY

OIL FIELDS
Computerized Simulation
BETA3A user' s manual, 8: 43274 (R:NO)
BETAPLOT user' s manual, 8: 43275 (R:NO)

OIL FURNACES
Heat Exchangers
Evaluation of the low-temperature heat-exchanger fouling problem. Phase I report. Literature review and work plan, 8: 44061 (R:US)

OIL SAND OILS
See BITUMENS

OIL SHALE DEPOSITS
Explosive Fracturing
Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8: 43305 (R:US)

OIL SHALE WASTE WATER
See OIL SHALES
WASTE WATER
OIL SHALES
See also BLACK SHALES
Combustion Products
Kinetic study of NO/sub x/ formation and removal processes in combustion streams. Fourth quarterly technical progress report, March 1, 1983-May 31, 1983, 8: 44659 (R:US)
In-Situ Retorting
Development of a local void-defect model which accounts for yield losses caused by flow nonuniformities, 8: 43303 (R:US)
Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8: 43305 (R:US)
Leaching
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8: 43306 (R:US)
Mineralogy
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8: 43306 (R:US)
OIL SPILL FINGERPRINTING
See OIL SPILLS
PATTERN RECOGNITION
OIL SPILLS
Removal
Full scale tests with oil recovery systems offshore. Norway, June 1980, 8: 43287 (R:NO)
OIL WELLS
Blowout Preventers
Well control in case of offshore blowout. Diversion, 8: 43278 (R:NO)
Blowouts
Well control in case of offshore blowout. Oil collection on platforms, 8: 43279 (R:NO)
Well control in case of offshore blowout. Mechanized drill pipe handling, stabbing, stripping/snubbing, drill string telemetry and mud monitoring, better BOP, 8: 43280 (R:NO)
Well control in case of offshore blowout. Well killing-final control-after shut-in in relation to the various control methods, 8: 43281 (R:NO)
Well control in case of offshore blowout. Capping on the sea floor, blowout risk of subsea oil production, 8: 43282 (R:NO)
Carbon Dioxide Injection
CO_2 formation damage study. Final report, 8: 43273 (R:US)
Little Knife field CO_2 minitest, Billings County, North Dakota. Vol. II. Appendices. Final report, 8: 43272 (R:US)
Little Knife Field CO_2 minitest, Billings County, North Dakota. Final report. Volume 1. Technical report, 8: 43271 (R:US)
Formation Damage
CO_2 formation damage study. Final report, 8: 43273 (R:US)
Reservoir Fluids
Winfrith PVT Package, 8: 43291 (R:GB)
Underwater Facilities
Well control in case of offshore blowout. Capping on the sea floor, blowout risk of subsea oil production, 8: 43282 (R:NO)
OINTMENTS
Chemical Radiation Effects
Sterilization of topical products by cobalt-60. Coordinated programme in practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 August 1980 - 31 July 1981, 8: 44792 (R:XA)
Sterilization
Sterilization of topical products by cobalt-60. Coordinated programme in practices for the radiation sterilization of medical supplies in countries of Asia and the Pacific Region. Final report for the period 1 August 1980 - 31 July 1981, 8: 44792 (R:XA)
OMAN
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
OMEGA FACILITY
Research Programs
LLE Review. Quarterly report, July 1982-September 1982, 8: 45212 (R:US)
OMEGA-784 RESONANCES
Particle Production
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)
Weak Particle Decay
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)
ON-LINE COMPUTERS
See COMPUTERS
ON-LINE SYSTEMS
ON-LINE MEASUREMENT SYSTEMS
Image Processing
RTFAS automated system for image processing. System journal, 8: 45294 (R:SU:In Russian)
ON-LINE SYSTEMS
See also ON-LINE MEASUREMENT SYSTEMS
Computer Graphics
Software structure of computer graphics for on-line physical experiments, 8: 45297 (R:SU:In Russian)
Data Processing
Operation with files in the mode of sequential access in the system of spectra processing, 8: 45299 (R:SU:In Russian)
Programming
Basis software for microprogrammed channel controller for operation on-line with experimental physical installations, 8: 44637 (R:SU:In Russian)
ONTARIO
Fossil-Fuel Power Plants
Coal-fired power generation in Ontario - A 60 year phenomenon coal ash disposal in Ontario. A 1000 year legacy, 8: 43194 (RA:DK)
OPERATORS(QUANTUM FIELD THEORY)
See QUANTUM OPERATORS
OPERATORS(QUANTUM MECHANICAL)
See QUANTUM OPERATORS
OPTICAL FIBERS
Temperature Effects
Measurement of peak temperature along an optical fiber, 8: 44650 (J:US)
Uses
Optical fibers and their instrumentation applications, 8: 44630 (R:FR:In French)
OPTICAL FILTERS
Coatings
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)
Reflectivity
Optical transmission through aerosol deposits on diffusely reflective filters: a method for measuring the absorbing component of aerosol particles, 8: 45084 (J:US)
OPTOACOUSTIC CELLS
See PHOTOACOUSTIC SPECTROMETERS
ORAL CAVITY
Radiotherapy
Radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx, 8: 44773 (R:PL:In Polish)
OREGON
Biomass Conversion Plants
Liquid fuels from wood by continuous operation of the Albany, Oregon biomass liquefaction facility, 8: 43441 (BA:US)
Radiation Monitoring
Formerly utilized MED/AEC sites remedial action progam. Radiological survey of the Albany Metallurgical Research Center, United States Bureau of Mines, Biomass Facility and the Back Forty Area, Albany, Oregon, 8: 44697 (R:US)
ORGANIC ACIDS
Excluding NUCLEIC ACIDS and NUCLEOTIDES.
Aerosol Monitoring
New approach to the determination of atmospheric strong acids, 8: 44670 (RA:DE)

Atmospheric Chemistry
New approach to the determination of atmospheric strong acids, 8: 44670 (RA:DE)
Production
Production of organic acids from biomass by acid hydrolysis and fermentation, 8: 43518 (J:US)
ORGANIC COMPOUNDS
See also AROMATICS
CARBOHYDRATES
HYDROCARBONS
HYDROXY COMPOUNDS
KETONES
ORGANIC ACIDS
ORGANIC SULFUR COMPOUNDS
ORGANOMETALLIC COMPOUNDS
PROTEINS
Ion Emission
Some general regularities of secondary ion emission form organic substances, 8: 44869 (RA:SU:In Russian)
Labelling
Isotopic labelling applied to the infrared spectra of metal complexes, 8: 44345 (B:ZA)
X-Ray Spectra
EXAFS study of bromomanganate ions in molten salts, 8: 44286 (J:US)
ORGANIC SOLVENTS
Electron Mobility
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8: 44359 (R:US)
Hydrogenation
Coal liquefaction technology development in NEDO, 8: 43156 (RA:US)
Radiolysis
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8: 44359 (R:US)
ORGANIC SULFUR COMPOUNDS
See also METHIONINE
Formation Heat
Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986, 8: 44350 (R:US)
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
NMR Spectra
Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986, 8: 44350 (R:US)
Photoionization
Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986, 8: 44350 (R:US)
Structural Chemical Analysis
Heats of formation of gas phase organosulfur molecules, radicals, and ions measured by PEPICO and applications of ^{17}O and ^{33}S NMR spectroscopy to structure determinations of organosulfur compounds, June 1, 1983 to May 31, 1986, 8: 44350 (R:US)
ORGANOMETALLIC COMPOUNDS
For compounds of metals and semimetals with organic compounds, but only when the metal or semimetal is directly bound to carbon.
See also TEL
Chemical Preparation
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8: 44349 (R:US)
ORNL RESEARCH REACTOR
See ORR REACTOR
ORPHEE REACTOR
Beam Holes
New steady state medium flux neutron source, 8: 43885 (R:FR)
ORR REACTOR
Reactor Operation
Oak Ridge Research Reactor quarterly report, October, November and December 1982, 8: 43893 (R:US)
OSCILLATIONS (PLASMA)
See PLASMA WAVES
OSIRIS REACTOR
In Pile Loops
ISABELLE-4 loop: a PWR testing loop loaded and unloaded in the pool of the Osiris reactor, 8: 43884 (R:FR:In French)
OSMIUM COMPLEXES
Excited States
Theoretical model for the luminescing excited states of Ru(bpy)$_3$2i and Os(bpy)$_3^{2+}$ (bpy = 2,2'-bipyridine), 8: 44334 (R:US)
OSMOTIC POWER PLANTS
See SALINITY GRADIENT POWER PLANTS
OTISCA PROCESS
Otisca T-Process: a new coal beneficiation approach for the preparation of coal slurries, 8: 43253 (RA:US)
OUTER CONTINENTAL SHELF
See CONTINENTAL SHELF
OUTGASSING
See DEGASSING
OXIDES
See also ALUMINIUM OXIDES
CARBON OXIDES
CERIUM OXIDES
CHROMIUM OXIDES
EUROPIUM OXIDES
IRON OXIDES
MAGNESIUM OXIDES
NICKEL OXIDES
NITROGEN OXIDES
PLUTONIUM OXIDES
SILICON OXIDES
SODIUM OXIDES
SULFUR OXIDES
TANTALUM OXIDES
THORIUM OXIDES
URANIUM OXIDES
ZINC OXIDES
Sputtering
Materials sputtering by fission fragments, 8: 44876 (RA:SU:In Russian)
OXIRANS
See EPOXIDES
OXOPROPANE
See ACETONE
OXY MODIFIED IN-SITU PROCESS
Before March 7, 1977 GARRETT PROCESS was used for this process.
Research Programs
Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8: 43305 (R:US)
OXYGEN
Adsorption
Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8: 44218 (J:US)
Breakdown
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Consumption Rates
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
Emission Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Interatomic Distances
Photoelectron-diffraction analysis of the structure of c(2 x 2)O on Ni(001), 8: 44218 (J:US)
Laser-Radiation Heating
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)
Metabolism
Local cerebral blood flow (1CBF) and oxygen consumption (1CMRO$_2$) in evolving irreversible ischemic infarction: a

study with positron tomography and oxygen-15, 8: 44762 (R:FR)
Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine, 8: 44765 (R:FR:In French)
Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man, 8: 44764 (R:FR)
Photoproduction
Application of intact algae to the biophotolysis, 8: 43419 (J:US)
Visible Spectra
Spectroscopic investigation of laser-initiated low-pressure plasmas in atmospheric gases, 8: 45188 (J:US)

OXYGEN 15
Positron Computed Tomography
Local cerebral blood flow (1CBF) and oxygen consumption ($1CMRO_2$) in evolving irreversible ischemic infarction: a study with positron tomography and oxygen-15, 8: 44762 (R:FR)
Local cerebral blood flow and local oxygen consumption in prolonged hemiplegic migraine, 8: 44765 (R:FR:In French)
Measurement of local blood flow and oxygen consumption in evolving irreversible cerebral infarction: an in vivo study in man, 8: 44764 (R:FR)

OXYGEN 16
E1-Transitions
Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations, 8: 44978 (J:US)
Energy Levels
Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations, 8: 44978 (J:US)
M1-Transitions
Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations, 8: 44978 (J:US)

OXYGEN 16 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)

OXYGEN 16 REACTIONS
Breakup Reactions
Correlations between projectile and target break-up in intermediate and high energy heavy ion collisions, 8: 44976 (R:SE)
Elastic Scattering
Optical potential description of $^{16}O + ^{28}Si$ elastic scattering, 8: 44991 (J:NL)
Fragmentation
Anomalous reaction mean free paths of nuclear projectile fragments from heavy ion collisions at 2A GeV, 8: 44982 (J:US)

OXYGEN 16 TARGET
Pion Plus Reactions
Diffraction theory and the double-charge-exchange reaction $^{16}O(\pi^+,\pi^-)\,^{16}Ne$, 8: 44983 (J:US)
Diffractive angular distribution for $^{16}O(\pi^+, \pi^-)^{16}Ne$(g.s.), 8: 44980 (J:US)

OXYGEN 17
Hypernuclei
Σ Hypernuclei, 8: 44926 (J:US)

OXYGEN 18 TARGET
Pion Reactions
Pion single and double charge exchange in the resonance region: Dynamical corrections, 8: 45034 (J:US)

OXYGEN 19
Energy Levels
Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction, 8: 44984 (J:US)

OXYGEN EFFECT (RADIOBIOLOGY)
See OXYGEN

OXYGEN HYDRIDES
See WATER

OXYGEN IONS
Electron-Ion Collisions
Quantum-defect and distorted-wave theory applied to the resonance contribution of inelastic electron scattering, 8: 44898 (J:US)

OXYMETHYLENE
See FORMALDEHYDE

OYSTER CREEK-1 REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)

OZONE
Atmospheric Chemistry
Photochemical oxidants in north-western Europe 1976-79. A pilot project, 8: 44681 (R:NO)
Photochemical Reactions
Surface ozone in the Cologne region, 8: 44683 (R:DE:In German)

P

PACIFIC NORTHWEST REGION
See FEDERAL REGION X

PACKAGING
Design
Transportation packaging for processed transuranic waste, 8: 43333 (R:US)
Safety
SCALE: a modular code system for performing standardized computer analyses for licensing evaluation. Volume 1. Control modules, 8: 43408 (R:US)

PAH
See POLYCYCLIC AROMATIC HYDROCARBONS

PAIR SPECTROMETERS
Angular Correlation
Installation for measuring angular correlation of two-photon annihilation of positrons in a condensed medium, 8: 44576 (R:SU:In Russian)
Li-Drifted Ge Detectors
Pair gamma-spectrometer, 8: 44326 (R:SU:In Russian)
Li-Drifted Si Detectors
Accelerating field spectrometer for photons and electrons simultaneous measurement. Application to decay schemes study, 8: 44564 (R:FR:In French)
NaI Detectors
Pair gamma-spectrometer, 8: 44326 (R:SU:In Russian)

PALISADES-1 REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)

PALLADIUM
Adsorption
Site determination for palladium on niobium using angle-resolved photoemission, 8: 44217 (J:US)
Annealing
Recovery of deformed and hydrogen-charged palladium, 8: 44228 (BA:NL)
Annihilation
Recovery of deformed and hydrogen-charged palladium, 8: 44228 (BA:NL)
Catalytic Effects
Silane surface chemistry of palladium: synthesis of silaethylene, silacyclobutadiene, and silabenzene, 8: 44339 (J:US)
Fermi Level
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8: 44197 (R:US)
Photoemission
Site determination for palladium on niobium using angle-resolved photoemission, 8: 44217 (J:US)

PALLADIUM BASE ALLOYS
Amorphous State
Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g), 8: 44232 (BA:NL)

Physical Radiation Effects
Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983, 8: 44133 (R:US)

PARABOLIC TROUGH COLLECTORS
Design
Systematic rotation and receiver location error effects on parabolic trough annual performance, 8: 43648 (J:GB)
Performance
Systematic rotation and receiver location error effects on parabolic trough annual performance, 8: 43648 (J:GB)
Rotation
Systematic rotation and receiver location error effects on parabolic trough annual performance, 8: 43648 (J:GB)

PARAMETRIC INSTABILITIES
Parametric instabilities near the critical density in steepened density profiles, 8: 45164 (J:US)

PARTICLE IDENTIFICATION
Data Processing
Program selection of physical hypothesis in the film information processing system, 8: 44599 (R:SU:In Russian)

PARTICLE SIZE
Aerosol Monitoring
Aerosol measurement by photon correlation spectroscopy, 8: 44674 (RA:DE)
Measuring Methods
Measurement procedure for acquisition of spatial inhomogeneous aerosol concentrations, 8: 44673 (RA:DE)
Separation Processes
Investigation to the separation efficiency of a cyclone separator using a stray light particle size counting technique, 8: 44672 (RA:DE:In German)
Spatial Distribution
Measurement procedure for acquisition of spatial inhomogeneous aerosol concentrations, 8: 44673 (RA:DE)

PARTICLE SIZE CLASSIFIERS
Real Time Systems
Real-time aerodynamic particle size analyzer, 8: 44636 (RA:DE)

PARTICLE TRACKS
Image Processing
Determination of beam particle track parameters in experiments on the MIS installation (JINR), 8: 44584 (R:SU:In Russian)
Parameter choice of a special microprocessor, 8: 44583 (R:SU:In Russian)

PARTICLE-HOLE MODEL
Skyrme Potential
Effective Skyrme-type interaction for the calculation of nuclear structures of the whole mass table, 8: 45029 (R:BE:In Dutch)

PARTICULATES
Prior to September 1981, this concept was indexed to PARTICLES and AEROSOLS.
Chemical Composition
Chemical and mutagenic characteristics of diesel-exhaust particles from different diesel fuels, 8: 44687 (R:US)
Mutagen Screening
Chemical and mutagenic characteristics of diesel-exhaust particles from different diesel fuels, 8: 44687 (R:US)

PASSIVE SOLAR COOLING SYSTEMS
See also ROOF PONDS
Cold Storage
Long-term ice storage for cooling applications using passive freezing techniques, 8: 43613 (RA:US)
Commercialization
Overview of the Passive and Hybrid Solar Energy Program, 8: 43549 (RA:US)
Overview of the National Passive Solar Products Program, 8: 43621 (RA:US)
Southern Solar Energy Center Passive Buildings Program, 8: 43555 (RA:US)
Computerized Simulation
Investigation of passive cooling techniques for hot-humid climates, 8: 43569 (RA:US)
Design
Passive solar home, Houston, 8: 43577 (RA:US)
Education
Passive building climatology curriculum development, 8: 43620 (RA:US)
Passive studio and case studies for design professionals, 8: 43619 (RA:US)
Experiment Planning
LASL passive program, 8: 43570 (RA:US)
Heat Pipes
Long-term ice storage for cooling applications using passive freezing techniques, 8: 43613 (RA:US)
Heat Sinks
Investigation of passive cooling techniques for hot-humid climates, 8: 43569 (RA:US)
Ice
Long-term ice storage for cooling applications using passive freezing techniques, 8: 43613 (RA:US)
Meetings
US Department of Energy Passive and Hybrid Solar Energy Program update meeting, 8: 43548 (R:US)
Performance
Passive cooling and solar heating validation project to assist commercialization in warm humid climates, 8: 43618 (RA:US)
Research Programs
Overview of the National Passive Solar Products Program, 8: 43621 (RA:US)
Passive cooling program overview, 8: 43612 (RA:US)
Technology Assessment
Global state-of-the-art of passive cooling and dehumidification, with potential applications for overheated US conditions, 8: 43615 (RA:US)

PASSIVE SOLAR HEATING SYSTEMS
See also DIRECT GAIN SYSTEMS
ROOF PONDS
TROMBE WALLS
WATER WALLS
Atria
Solar atrium: a hybrid solar heating and cooling system, 8: 43609 (RA:US)
Building Codes
Passive solar standards, performance criteria and code provisions, 8: 43553 (RA:US)
Commercialization
Overview of the Passive and Hybrid Solar Energy Program, 8: 43549 (RA:US)
Overview of residential buildings program, 8: 43550 (RA:US)
Overview of the National Passive Solar Products Program, 8: 43621 (RA:US)
Passive solar commercialization in the Northeast, 8: 43554 (RA:US)
Passive solar: the 80's and the West, 8: 43556 (RA:US)
Toward passive and hybrid solar commercial buildings, 8: 43589 (RA:US)
Comparative Evaluations
Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar, 8: 43641 (RA:US)
Computer Codes
Design of passive/hybrid solar systems for manufactured metal buildings for commercial and industrial applications, 8: 43599 (RA:US)
Construction
Denver Metro Home Builders Program, 8: 43558 (RA:US)
Control Systems
Impact of controls in passive solar heating of buildings, 8: 43567 (RA:US)
Decision Making
Passive solar retrofit of all-glass office buildings, 8: 43595 (RA:US)
Demonstration Programs
Selected strategies and results from Commercial Buildings Design and Demonstration Program (PON), 8: 43593 (RA:US)
Design
Design of passive commercial buildings: background and major lessons learned, 8: 43590 (RA:US)

Design of passive/hybrid solar systems for manufactured metal buildings for commercial and industrial applications, 8: 43599 (RA:US)
Iowa-project passive: a passive solar house design being built by selected Iowa Community College building trade programs, 8: 43586 (RA:US)
Passive and hybrid solar manufactured housing and buildings. Phase I, 8: 43565 (RA:US)
Passive solar home, Houston, 8: 43577 (RA:US)
Economic Analysis
Passive solar economic and market analysis, 8: 43479 (RA:US)
Education
Iowa-project passive: a passive solar house design being built by selected Iowa Community College building trade programs, 8: 43586 (RA:US)
Passive building climatology curriculum development, 8: 43620 (RA:US)
Passive studio and case studies for design professionals, 8: 43619 (RA:US)
Energy Analysis
Applications of DOE-2 for the analysis of passive solar buildings, 8: 43571 (RA:US)
Field Tests
Design and construction of three manufactured passive solar homes: a field test, 8: 43563 (RA:US)
Heat Storage
Product spin-offs from MIT Solar Building No. 5, 8: 43629 (RA:US)
Manuals
Passive solar construction handbook, 8: 43636 (RA:US)
Marketing
Building supplier as energy information center, 8: 43485 (RA:US)
Passive and hybrid solar manufactured housing and buildings. Phase I, 8: 43565 (RA:US)
Residential passive solar development and marketing, 8: 43624 (RA:US)
Marketing Research
Overview of the regional market studies, 8: 43480 (RA:US)
Passive solar economic and market analysis, 8: 43479 (RA:US)
Meetings
US Department of Energy Passive and Hybrid Solar Energy Program update meeting, 8: 43548 (R:US)
Modular Structures
Modularization of passive solar, 8: 43631 (RA:US)
Performance
Passive cooling and solar heating validation project to assist commercialization in warm humid climates, 8: 43618 (RA:US)
Passive solar standards, performance criteria and code provisions, 8: 43553 (RA:US)
Qualitative approach to performance evaluation of passive solar residences, 8: 43587 (RA:US)
Shelly Ridge Program Center building, 8: 43598 (RA:US)
Performance Testing
Overview of DOE national performance evaluation program, 8: 43579 (RA:US)
Solar atrium: a hybrid solar heating and cooling system, 8: 43609 (RA:US)
Phase Change Materials
Study of the effectiveness of selective absorber coatings and phase change materials in passive solar space heating, 8: 43628 (RA:US)
Program Management
Denver Metro Home Builders Program, 8: 43558 (RA:US)
Public Relations
Development and implementation of passive solar information/promotion plan, 8: 43484 (RA:US)
Development and implementation of passive solar information/promotion plan, 8: 43588 (RA:US)
Recommendations
Critical analysis of the home builder's introduction to passive solar in New York State, 8: 43585 (RA:US)
Design of passive commercial buildings: background and major lessons learned, 8: 43590 (RA:US)
Research Programs
Design of passive commercial buildings, 8: 44063 (RA:US)
LASL passive program, 8: 43570 (RA:US)
Overview of the National Passive Solar Products Program, 8: 43621 (RA:US)
Toward passive and hybrid solar commercial buildings, 8: 43589 (RA:US)
Retrofitting
DOE Passive Commercial Demonstration Program update report, 8: 43604 (RA:US)
Passive solar retrofit of all-glass office buildings, 8: 43595 (RA:US)
Pfister residence - results of a passive retrofit in a cold climate, 8: 43580 (RA:US)
Solar Reflectors
Product spin-offs from MIT Solar Building No. 5, 8: 43629 (RA:US)
Spectrally Selective Surfaces
Product spin-offs from MIT Solar Building No. 5, 8: 43629 (RA:US)
Study of the effectiveness of selective absorber coatings and phase change materials in passive solar space heating, 8: 43628 (RA:US)
Standards
Passive solar standards, performance criteria and code provisions, 8: 43553 (RA:US)
Thermal Analysis
Advanced techniques in passive solar analysis, 8: 43596 (RA:US)
Building energy analysis of integrated passive designs, 8: 43601 (RA:US)
Thermosyphons
De Graff Nature Center: passive solar heated park and recreational building, 8: 43605 (RA:US)
Windows
Critical analysis of the home builder's introduction to passive solar in New York State, 8: 43585 (RA:US)

PATTERN RECOGNITION
Pattern recognition method for nuclear reactor core surveillance, 8: 43759 (R:FR:In French)

PAVEMENTS
Waste Product Utilization
Kiln dust-fly ash systems for highway bases and subbases, 8: 44100 (R:US)

PDX DEVICES
ECR Heating
PDX ECRH, 8: 45097 (RA:US)
Plasma Drift
Plasma rotation in the PDX tokamak, 8: 45151 (R:US)
Thermal Conduction
Heat conduction process in tokamak hot-ion plasmas, 8: 45102 (R:US)

PEAKING POWER PLANTS
Low-cost peaking capability built into base-load coal-fired power plants, 8: 43725 (R:US)

PEARL SPAR
See DOLOMITE

PEAT
Biodegradation
Vyrmethane. Progress report stage 5. In situ production of methane gas from peat, 8: 43182 (R:SE:In Swedish)
Combustion
Pellets as fuel. Basic properties and experience from tests in moving grate firing units, 8: 43471 (R:SE:In Swedish)
Degassing
Vyrmethane. Progress report stage 5. In situ production of methane gas from peat, 8: 43182 (R:SE:In Swedish)
Market
Strategic analysis. A proposal for a method of investigation illustrated by the future competing situation of coal with biomass fuels, 8: 43266 (R:SE:In Swedish)
Mining
Hydrological environmental consequences of peat extraction. Preliminary study, 8: 43242 (R:SE:In Swedish)
Prospecting
System for the investigation of peat bog by radar. Final report. Stage 2, 8: 43244 (R:SE:In Swedish)

PEBBLE BED REACTORS
After-Heat Removal
Development of a system for rapid discharge of spherical fuel elements as a diversitary afterheat removal system for pebble-bed HTR-type reactors, 8: 43791 (R:DE:In German)
Fuel Elements
Migration behaviour of fission products in and from spherical HTR fuel elements (SAPHIR loop experiments in the PEGASE reactor), 8: 43848 (R:DE)
Loss of Coolant
Plate out of fission products in the primary circuit of the HTR during extreme core cooling accidents illustrated for the PNP-500, 8: 43922 (R:DE:In German)
PELLETS (FUEL)
See FUEL PELLETS
PENNSYLVANIA
Coal Gasification Plants
Coal gasification at Caterpillar's York, Pennsylvania, plant, 8: 43180 (RA:US)
PEOPLE
See HUMAN POPULATIONS
PEP STORAGE RINGS
Beam Dynamics
Handy impedance formulae, incoherent synchrotron frequency, and head-tail tune shift in PEP, 8: 44505 (R:US)
Threshold current for the transverse single-bunch instability in PEP, 8: 44502 (R:US)
Beam-Beam Interactions
Evaluation of the beam-beam effect in PEP using Myer's simulation program, 8: 44503 (R:US)
PERMIT APPLICATIONS
Business criteria for coal gasification, 8: 43158 (RA:US)
PEROVSKITE
Structural Chemical Analysis
Oxygen-perovskites with fourvalent rare earth metals, 8: 44346 (B:DE:In German)
PERSONNEL
Studies of groups of persons employed in a particular field of endeavor. For studies on individuals in a group see also MAN.
See also MINERS
PROFESSIONAL PERSONNEL
REACTOR OPERATORS
Radiation Doses
Beta dosimetry at a nuclear fuel separation facility, 8: 44789 (R:US)
Training
Training Kentuckians for industrial jobs: a longitudinal study, 8: 45287 (R:US)
PERSONNEL DOSIMETRY
Thermoluminescent Dosemeters
Fading and buildup in TLD-100 cards used for personal dosimetry, 8: 44621 (R:IL:In Hebrew)
PERSONNEL FILM DOSIMETRY
See PERSONNEL DOSIMETRY
PERTURBATION THEORY
Quantum Electrodynamics
Algebraic description of perturbation theory in quantum electrodynamics, 8: 44949 (R:AU)
PESTICIDES
Environmental standards, 8: 43993 (RA:US)
PETROCHEMICAL FEEDSTOCKS
See CHEMICAL FEEDSTOCKS
PETROLEUM
Limited to crude oil; see also COAL LIQUIDS, SHALE OIL, etc.
Consumption Rates
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
Enhanced Recovery
Flow in porous media, phase behavior and ultralow interfacial tensions: mechanisms of enhanced petroleum recovery. Final report, 8: 43270 (R:US)
Forecasting
Oil market Simulation model documentation report (OMS model), 8: 44038 (R:US)
Imports
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
Market
Oil supply/demand pricing trends, 8: 44034 (RA:US)
Phase Studies
Displacement of oil by carbon dioxide. Annual report, October 1981-September 1982, 8: 43276 (R:US)
Prices
Increased opportunities for coal in industrial markets (USA; 1930 to 1982), 8: 43265 (RA:US)
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Oil market Simulation model documentation report (OMS model), 8: 44038 (R:US)
Oil supply/demand pricing trends, 8: 44034 (RA:US)
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
Production
Oil supply/demand pricing trends, 8: 44034 (RA:US)
Refining
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Reserves
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG (FRG and global aspects), 8: 43151 (RA:US)
Supply and Demand
Oil supply/demand pricing trends, 8: 44034 (RA:US)
Short-term energy outlook. Volume 1. Quarterly projections, 8: 44027 (R:US)
PETROLEUM DEPOSITS
See also OIL FIELDS
Energy Source Development
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
Exploration
Outer Continental Shelf oil and gas activities in the Gulf of Alaska and their onshore impacts. Gulf of Alaska summary report update, April 1983, 8: 44040 (R:US)
Resource Potential
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
PETROLEUM DISTILLATES
Boiling point range 0-600° C.
Prices
Petroleum marketing monthly, 8: 43285 (R:US)
Sales
Petroleum marketing monthly, 8: 43285 (R:US)
PETROLEUM INDUSTRY
Energy Models
Oil market Simulation model documentation report (OMS model), 8: 44038 (R:US)
Energy Source Development
Third World petroleum development: a statement of principles, 8: 44039 (R:US)
Investment
Third World petroleum development: a statement of principles, 8: 44039 (R:US)

PETROLEUM REFINERIES
Flowsheets
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Mathematical Models
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Training
Energy plant process operations Curriculum-Development Project. Final technical report, 8: 43283 (R:US)
PHANTOMS
Neutron Dosimetry
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
PHARYNX
Radiotherapy
Radiation therapy of cancer of the oral cavity, pharynx, paranasal sinuses and larynx, 8: 44773 (R:PL:In Polish)
PHASE CHANGE MATERIALS
Use with the specific phase change material (e.g. calcium chloride) when known.
Phase change materials in masonry construction, 8: 43650 (RA:US)
Performance Testing
Study of the effectiveness of selective absorber coatings and phase change materials in passive solar space heating, 8: 43628 (RA:US)
PHENANTHRENE
Removal
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
PHENOL
Removal
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
PHENOLS
See also PHENOL
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
PHENYLETHYLENE
See STYRENE
PHI-1019 RESONANCES
Particle Production
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)
Weak Particle Decay
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)
PHOSPHATES
For salts only; see also PHOSPHORIC ACID ESTERS.
See also AMERICIUM PHOSPHATES
BERKELIUM PHOSPHATES
Raman Spectra
Raman spectra of the transplutonium orthophosphates and trimetaphosphates, 8: 44365 (J:NL)
PHOSPHITES
See PHOSPHOROUS ACID
PHOSPHOROUS ACID
Iodometry
Quantitative determination of phosphorous and hypophosphorous acid, 8: 44333 (TJ:US)
PHOSPHORUS ADDITIONS
Deposition
Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings, 8: 44238 (TJ:US)
PHOTOACOUSTIC SPECTROMETERS
Design
Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios, 8: 44324 (R:US)
Performance Testing
Evaluation of a laser-based photoacoustic spectrometer in measurement of stable-isotope ratios, 8: 44324 (R:US)
PHOTOCHEMISTRY
Research Programs
Program summaries for 1982 - Energy Sciences programs, 8: 45284 (R:US)
PHOTODIODES
Physical Radiation Effects
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
Quantum Efficiency
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
PHOTODISINTEGRATION
See PHOTONUCLEAR REACTIONS
PHOTOELECTROCHEMICAL CELLS
Mathematical Models
Mathematical modeling and optimization of liquid-junction photovoltaic cells, 8: 43501 (R:US)
Optimization
Mathematical modeling and optimization of liquid-junction photovoltaic cells, 8: 43501 (R:US)
PHOTOGRAPHIC FILMS
Image Processing
Purpose and the principle of the organization of the automatic system for film information processing (ASMOFI), 8: 44600 (R:SU:In Russian)
PHOTOGRAPHS
See IMAGES
PHOTOMULTIPLIERS
Microchannel Electron Multipliers
Recent advances in high-speed photon detectors, 8: 44619 (R:US)
Reviews
Recent advances in high-speed photon detectors, 8: 44619 (R:US)
PHOTON ACTIVATION ANALYSIS
See ACTIVATION ANALYSIS
PHOTON BEAMS
Alignment
Measurement of laser beam divergence, 8: 44406 (J:US)
Beam Optics
Measurement of laser beam divergence, 8: 44406 (J:US)
PHOTON DETECTION (GAMMA)
See GAMMA DETECTION
PHOTON DETECTION (X-RAY)
See X-RAY DETECTION
PHOTONUCLEAR REACTIONS
Cross Sections
Ensuring by multigroup constants for calculations of photoneutron sources, 8: 45002 (R:SU:In Russian)
Knock-Out Reactions
Isospin mixing in the ^{4}He giant dipole resonance, 8: 44971 (J:US)
Photoneutron cross sections for the silicon isotopes, 8: 44993 (J:US)
Photoproduction
Threshold pion photoproduction from the trinucleon, 8: 44947 (J:NL)
PHOTOSYNTHESIS
Biomimetic Processes
Chloroplast bioengineering: the greening of chloroplasts in vitro, 8: 43526 (J:US)
PHOTOVOLTAIC CONVERSION
Institutional Factors
Photovoltaic status assessment: industry perspective, 8: 43532 (RA:US)
Research Programs
Photovoltaic energy systems. Program summary, fiscal year 1982, 8: 43491 (R:US)
Technology Assessment
Photovoltaic status assessment: government perspective, 8: 43497 (RA:US)
PHOTOVOLTAIC POWER PLANTS
Economic Analysis
Photovoltaic system requirements: central and distributed applications, 8: 43530 (RA:US)
PHOTOVOLTAIC POWER SUPPLIES
Economic Analysis
Photovoltaic system requirements: central and distributed applications, 8: 43530 (RA:US)

Field Tests
Photovoltaic field test performance assessment, 8: 43531 (RA:US)
Meetings
EPRI conference proceedings: solar and wind power - 1982 status and outlook, 8: 43536 (R:US)
Operation
Airport solar photovoltaic concentrator, Phase III. Project status report No. ASPCP III-4, 1 February 1983-30 April 1983, 8: 43529 (R:US)
Performance
Airport solar photovoltaic concentrator, Phase III. Project status report No. ASPCP III-4, 1 February 1983-30 April 1983, 8: 43529 (R:US)
Solar Water Pumps
Development and testing of a submersible motor pump driven by a solar cell generator, 8: 43490 (R:DE:In German)

PHYSICAL RADIATION EFFECTS
Computerized Simulation
Computer simulation of displacement cascades in copper, 8: 44139 (R:US)

PIGE ANALYSIS
See PROTON REACTIONS

PIGMENT CELLS
See ANIMAL CELLS

PILOT PLANTS
See also BARSTOW SOLAR PILOT PLANT
Equipment
Equipment-performance survey of the Bi-Gas coal-gasification pilot plant, 8: 43169 (R:US)

PINS (FUEL)
See FUEL PINS

PION MINUS REACTIONS
Capture
Spin flip transitions in ^{13}C and ^{19}F probed with the (π^-,γ) reaction, 8: 44984 (J:US)
Charge-Exchange Reactions
Observation of the nuclear isovector monopole resonance, 8: 45004 (J:US)
Transition densities for charge-exchange components of giant isovector resonances and the proton-neutron density distributions in nuclei, 8: 45035 (J:US)
Giant Resonance
Transition densities for charge-exchange components of giant isovector resonances and the proton-neutron density distributions in nuclei, 8: 45035 (J:US)
Inelastic Scattering
Excitation functions of the $^{127}I(\pi,\pi xn)$ reactions in the region of the (3,3) resonance, 8: 45007 (J:US)
Knock-Out Reactions
Excitation functions of the $^{127}I(\pi,\pi xn)$ reactions in the region of the (3,3) resonance, 8: 45007 (J:US)
Particle Production
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)
Total Cross Sections
Final report on total cross section measurements (New Mexico State University), 8: 44974 (R:US)

PION MINUS-PROTON INTERACTIONS
Elastic Scattering
Elastic scattering of π^{+-} and K^{+-} on protons at 100 and 200 GeV/c, 8: 44923 (J:US)

PION PLUS REACTIONS
Capture
Observation of a quasideuteron component in the reaction $^{13}C(\pi^+,2p)$, 8: 44981 (J:US)
Charged-Particle Reactions
Diffractive angular distribution for $^{16}O(\pi^+,\pi^-)^{16}Ne(g.s.)$, 8: 44980 (J:US)
Charge-Exchange Reactions
Diffraction theory and the double-charge-exchange reaction $^{18}O(\pi^+,\pi^-)\ ^{18}Ne$, 8: 44983 (J:US)
Energy deposition accompanying pion double charge exchange: Radiochemical study of the $^{209}Bi(\pi^+,\pi^-xn)$/sup 209-x/At reactions, 8: 45021 (J:US)
Observation of analog and nonanalog transitions in the reaction $^{56}Fe(\pi^+,\pi^-)^{56}Ni$, 8: 44997 (J:US)
Observation of the nuclear isovector monopole resonance, 8: 45004 (J:US)
Transition densities for charge-exchange components of giant isovector resonances and the proton-neutron density distributions in nuclei, 8: 45035 (J:US)
Fragmentation
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Giant Resonance
Transition densities for charge-exchange components of giant isovector resonances and the proton-neutron density distributions in nuclei, 8: 45035 (J:US)
Inclusive Interactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Inelastic Scattering
Excitation functions of the $^{127}I(\pi,\pi xn)$ reactions in the region of the (3,3) resonance, 8: 45007 (J:US)
Knock-Out Reactions
Excitation functions of the $^{127}I(\pi,\pi xn)$ reactions in the region of the (3,3) resonance, 8: 45007 (J:US)
Total Cross Sections
Final report on total cross section measurements (New Mexico State University), 8: 44974 (R:US)

PION PLUS-PROTON INTERACTIONS
Elastic Scattering
Elastic scattering of π^{+-} and K^{+-} on protons at 100 and 200 GeV/c, 8: 44923 (J:US)

PION REACTIONS
See also PION MINUS REACTIONS
PION PLUS REACTIONS
Charge-Exchange Reactions
Pion single and double charge exchange in the resonance region: Dynamical corrections, 8: 45034 (J:US)
Distorted Wave Theory
High resolution studies of pion-nucleus reaction mechanism, 8: 44975 (R:US)
Elastic Scattering
Pion single and double charge exchange in the resonance region: Dynamical corrections, 8: 45034 (J:US)
Inelastic Scattering
High resolution studies of pion-nucleus reaction mechanism, 8: 44975 (R:US)
Inelastic scattering of 162-MeV pions by ^{14}N, 8: 44985 (J:US)

PION-NUCLEON INTERACTIONS
Data Acquisition
PIPIN users guide: a users guide to the omicron Data Aquisition system, 8: 44623 (R:GB)
Particle Production
Beauty experiments at the SPS, 8: 44914 (R:CH)
Strange quark suppression in 225 GeV/c pi-minus beryllium interactions, 8: 44920 (R:US)

PIONS
See also PIONS MINUS
PIONS PLUS
Particle Production
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)

PIONS MINUS
Capture
Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8: 44899 (J:US)
Slowing-Down
Diabatic-state treatment of negative-meson moderation and capture. II. Mixtures of hydrogen and helium, 8: 44899 (J:US)

PIONS PLUS
Particle Production
Production of positive pions by 800 MeV protons on carbon, 8: 44986 (J:US)

PIPELINES
Flow Models
Severe slugging in two-phase flow systems, 8: 43290 (R:NO)
Leak Testing
Acoustic technique for pinpointing leaks in low-pressure gas mains, 8: 43297 (R:US)

Leaks
Acoustic technique for pinpointing leaks in low-pressure gas mains, 8: 43297 (R:US)
Shock Waves
Transients in pipes, 8: 44411 (R:BR)
PIPES
See also DRILL PIPES
Crack Propagation
Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8: 43752 (RA:US)
Subcritical fatigue crack growth under combined primary and secondary loads, 8: 44190 (RA:US)
Dynamic Loads
Design and analysis for piping systems, 8: 43856 (R:BR)
Fatigue
Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8: 43752 (RA:US)
Fracture Mechanics
Fracture mechanics evaluation of reactor piping reliability. Pt. 2. Simulation of pipe rupture probability (PWR; BWR), 8: 43966 (BA:NL)
Laminar Flow
Analysis of the flow close to a hump at the wall of a circular pipe, 8: 44907 (R:BR:In Portuguese)
Seismic Effects
Experimental damping data for dynamic analysis of nuclear power plant piping systems (PWR; BWR), 8: 43904 (R:US)
Nuclear power plant piping damping parametric effects, 8: 43907 (R:US)
Specifications
Design and analysis for piping systems, 8: 43856 (R:BR)
Stress Analysis
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a (BWR), 8: 43906 (R:US)
Experimental damping data for dynamic analysis of nuclear power plant piping systems (PWR; BWR), 8: 43904 (R:US)
Nuclear power plant piping damping parametric effects, 8: 43907 (R:US)
Use of the modal superposition technique for piping system blowdown analyses (PWR; BWR), 8: 43905 (R:US)
Transients
Transients in pipes, 8: 44411 (R:BR)
PITCHES
Coking
Electro graphite electrodes from coal tar pitch super needle coke for electric steel manufacturing, 8: 43189 (R:DE:In German)
PITTSBURGH ENERGY TECHNOLOGY CENTER
Research Programs
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
PITTSBURG-MIDWAY SOLVENT REFINED COAL PRO
See SRC PROCESS
PIXE ANALYSIS
Prior to October 1980, this concept was indexed to X-RAY EMISSION ANALYSIS.
Evaluation
Time sequential sampling and elemental analysis of indoor and outdoor aerosol, 8: 44671 (RA:DE)
PLACENTA
Permeability
Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8: 44786 (R:US)
PLANETS
Erosion
Sputtering in astrophysics and planetary science, 8: 44824 (RA:SU)
PLANNED COMMUNITIES
Economy
Marin Solar Village, 8: 44107 (RA:US)
Energy Efficiency
Marin Solar Village, 8: 44107 (RA:US)
Passive Solar Heating Systems
Residential passive solar development and marketing, 8: 43624 (RA:US)
PLANT GROWTH
Inhibition
Biobarriers used in shallow burial ground stabilization, 8: 43390 (J:US)
PLANTS
See also ALLIUM CEPA
FUNGI
GRASS
MILKWEED
TREES
WATER HYACINTHS
Biological Radiation Effects
Influence of enhanced UV-B irradiation on the growth and composition of plants, 8: 44790 (R:DE:In German)
Sensitivity
Introduction and perspectives of plant genetic and cytogenetic assays, 8: 44808 (J:NL)
Ultraviolet Radiation
Influence of enhanced UV-B irradiation on the growth and composition of plants, 8: 44790 (R:DE:In German)
PLANTS (INDUSTRIAL)
See INDUSTRIAL PLANTS
PLANTS (PILOT)
See PILOT PLANTS
PLANTS (POWER)
See POWER PLANTS
PLASMA
See also COLD PLASMA
COLLISIONAL PLASMA
EQUILIBRIUM PLASMA
HOT PLASMA
INHOMOGENEOUS PLASMA
LASER-PRODUCED PLASMA
LOW-BETA PLASMA
NON-EQUILIBRIUM PLASMA
RELATIVISTIC PLASMA
Ballooning Instability
Kinetic and fluid ballooning stability in anisotropic ion tokamaks, 8: 45158 (J:US)
Charged-Particle Transport Theory
Phenomenological theory of the anomalous transport in tokamaks, 8: 45141 (RA:JP)
Cyclotron Instability
Particle simulations of ion-cyclotron turbulence in a mirror plasma, 8: 45161 (J:US)
Diffusion
Comment on tandem-mirror transport, 8: 45190 (J:US)
Monte Carlo calculation of resonant diffusion coefficients in the ELMO Bumpy Torus and the applicability of local diffusion theory, 8: 45173 (J:US)
Electromagnetic Radiation
Electromagnetic drift modes driven by pressure gradients in tokamaks, 8: 45174 (J:US)
Electron Temperature
Electron temperature differences and double layers, 8: 45183 (J:US)
Electron-Electron Collisions
Analysis of the asymmetric part of electron—electron Boltzmann integral, 8: 45156 (J:US)
Energy Losses
Investigations of the magnetic structure and the decay of a plasma-gun-generated compact torus, 8: 45168 (J:US)
Radial transport, end loss, and ambipolarity in tandem mirrors, 8: 45159 (J:US)
Reduction of radial losses in bumpy tori, 8: 45162 (J:US)
Equilibrium
Ideal MHD equilibrium of a weakly toroidal plasma column with elongated cross-section. Part 3: Non-elliptical cross-section and summary, 8: 45154 (R:NL)
Investigations of the magnetic structure and the decay of a plasma-gun-generated compact torus, 8: 45168 (J:US)
Ion Acoustic Waves
Parametric instabilities near the critical density in steepened density profiles, 8: 45164 (J:US)
Ion-Atom Collisions
First research coordination meeting on atomic collision data for diagnostics of magnetic fusion plasmas, Vienna, 21-25 June 1982. Summary report, 8: 45112 (R:XA)

Kinetic Equations
Fokker-Planck equation for a plasma in a magnetic field with electrostatic fluctuations, 8: 45175 (J:US)
Nonlinear Problems
Parametric instabilities near the critical density in steepened density profiles, 8: 45164 (J:US)
Plasma Confinement
Catto and Myra respond:, 8: 45191 (J:US)
Plasma Heating
Radio-frequency wave enhanced runaway production rate, 8: 45179 (J:US)
Plasma Pressure
Electromagnetic drift modes driven by pressure gradients in tokamaks, 8: 45174 (J:US)
Potentials
Electron temperature differences and double layers, 8: 45183 (J:US)
Sound Waves
Acoustic plasma wave in inversion layers and sandwich structures, 8: 45107 (R:XA)
Statistical Mechanics
Topics in the theory of statistical closure approximations for plasma physics, 8: 45149 (R:US)
Transport Theory
Fokker-Planck equation for a plasma in a magnetic field with electrostatic fluctuations, 8: 45175 (J:US)
Kinetic theory of the anomalous transport, 8: 45142 (RA:JP)
Turbulence
Particle simulations of ion-cyclotron turbulence in a mirror plasma, 8: 45161 (J:US)
Two-Stream Instability
Parametric instabilities near the critical density in steepened density profiles, 8: 45164 (J:US)
Viscosity
Calculation of parallel viscosity in the plateau regime, 8: 45177 (J:US)

PLASMA ACCELERATORS
See PLASMA GUNS

PLASMA DENSITY
Disturbances
Dynamics of ionization and transport in a magnetically confined plasma column, 8: 45128 (RA:CS)
Phase Transformations
Surface density profile and surface tension of the one-component classical plasma, 8: 45109 (R:XA)
Short Wave Radiation
Generalization of barometric formula for a sollisional plasma in a magnetostatic and rf fields, 8: 45134 (RA:CS)

PLASMA DIAGNOSTICS
Balmer Lines
Diagnostics of nonequilibrium hydrogen plasma, 8: 45131 (RA:CS)
Data Processing
Andromeda - the system for the acquisition and numerical data processing and its application for experimental device tokamak TM-1-MH, 8: 45120 (RA:CS)
Information Needs
First research coordination meeting on atomic collision data for diagnostics of magnetic fusion plasmas, Vienna, 21-25 June 1982. Summary report, 8: 45112 (R:XA)
Interferometry
Automatization of ultrahigh frequency measurement methods of characteristics of pulsed plasma processes on-line with the M-7000 computer, 8: 45145 (R:SU:In Russian)
Ion Beams
Space potential, temperature, and density profile measurements on RENTOR, 8: 45101 (R:US)
Langmuir Probe
Negative-resistance characteristics of a Langmuir probe in a turbulent plasma, 8: 45192 (J:IT)
Neutron Spectroscopy
Time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device, 8: 45129 (RA:CS)
Soft X Radiation
Soft X-ray diagnostics on tokamak TM-1-MH, 8: 45121 (RA:CS)
Thomson Scattering
Apparatus for plasma electron temperature and density measurements by Thomson scattering, 8: 45130 (RA:CS)
X-Ray Detection
Soft X-ray and VUV emission from REB-heated plasma in Rebex 1 and Rebex 2 machines, 8: 45126 (RA:CS)

PLASMA DRIFT
Dispersion Relations
Dynamics of ionization and transport in a magnetically confined plasma column, 8: 45128 (RA:CS)

PLASMA FOCUS DEVICES
Neutron Spectroscopy
Time resolving method for determining the energy spectrum of neutrons emitted by a plasma focus device, 8: 45129 (RA:CS)

PLASMA GUNS
Plasma Diagnostics
Development of current sheat on output of coaxial gun, 8: 45125 (RA:CS)
Plasma Production
Investigations of the magnetic structure and the decay of a plasma-gun-generated compact torus, 8: 45168 (J:US)

PLASMA HEATING
See also BEAM INJECTION HEATING
HIGH-FREQUENCY HEATING
JOULE HEATING
Fusion Reactions
A variance reduction technique for coulomb-nuclear thermalization of energetic fussion products in hot plasmas, 8: 45193 (J:US)

PLASMA INSTABILITY
Inhibition
Suppression of the n = 2 rotational instability in field-reversed configurations, 8: 45185 (J:US)
Nonlinear Problems
Vectorized Monte Carlo for nonlinear radiation transport, 8: 45283 (J:US)
Plasma Simulation
Particle simulation of plasmas, 8: 45189 (J:US)

PLASMA OSCILLATIONS
See PLASMA WAVES

PLASMA SHEATH
Plasma Production
Bywalled plasma formation in vacuum prolonged channels, 8: 45144 (R:SU:In Russian)

PLASMA SIMULATION
Reviews
Particle simulation of plasmas, 8: 45189 (J:US)

PLASMA WAVES
See also ELECTRON PLASMA WAVES
Plasma Simulation
Particle simulation of plasmas, 8: 45189 (J:US)

PLASTIC PROPERTIES
See PLASTICITY

PLASTIC SCINTILLATION COUNTERS
See PLASTIC SCINTILLATION DETECTORS

PLASTIC SCINTILLATION DETECTORS
Efficiency
Study on the high-energy neutron fluence and dose rate meter response, 8: 44597 (R:SU:In Russian)

PLASTIC SCINTILLATORS
Efficiency
Experimental measurement of the photon efficiency of a 4 mm thick NE 102 A scintillator for 14 MeV neutrons, 8: 44566 (R:FR:In French)

PLASTICITY
Thermodynamics
Thermodynamic analysis of elastic-plastic deformation, 8: 45080 (R:BR)

PLASTICS INDUSTRY
Waste Product Utilization
Economic and energy audit of converting waste plastics to oil. Final report, 8: 44102 (R:US)

PLATES
Thicker than SHEETS or FOILS.

Elasticity
Quasi-estatic and dynamic elasto/viscoplastic analysis of plates and shells, 8: 44384 (R:BR:In Portuguese)
Plasticity
Quasi-estatic and dynamic elasto/viscoplastic analysis of plates and shells, 8: 44384 (R:BR:In Portuguese)
Thermal Conduction
Thermal resistance of a convectively cooled plate with applied heat flux and variable internal heat generation, 8: 44414 (R:BR)
Thermal Stresses
Photothermoelastic simulation of transient thermal stresses, 8: 44418 (R:BR)
Turbulent Flow
Transfer coefficients for turbulent flow between parallel plates, 8: 44425 (R:BR:In Portuguese)

PLATES (FUEL)
See FUEL PLATES

PLATINUM
Physical Radiation Effects
Direct determination of a radiation-damage profile with atomic resolution in ion-irradiated platinum. MSC report No. 5030, 8: 44131 (R:US)

PLATINUM 196 TARGET
Neutron Reactions
Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry, 8: 45022 (J:US)

PLATINUM 197
Energy Levels
Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry, 8: 45022 (J:US)

PLATINUM 198 TARGET
Neutron Reactions
Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry, 8: 45022 (J:US)

PLATINUM 199
Energy Levels
Level structure of ^{197}Pt, ^{199}Pt: Status of a possible multi-j supersymmetry, 8: 45022 (J:US)

PLATINUM BASE ALLOYS
Amorphous State
Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g), 8: 44232 (BA:NL)

PLATINUM ISOTOPES
See also PLATINUM 197
PLATINUM 199
Triton Reactions
Single proton structure of /sup 193,195,197/Ir and perturbed spin(6) symmetry, 8: 45019 (J:US)

PLESIOTHERAPY
See RADIOTHERAPY

PLOTTERS
Electron Beams
Plotting CV drawings on an electron-beam recorder, 8: 45317 (R:US)
Programming
Graph plotter software connected with computer M-6000 (Basic programs), 8: 45302 (R:SU:In Russian)

PLT DEVICES
Current-Drive Heating
Current-drive experiments on the PLT Tokamak, 8: 45148 (R:US)
Lower-hybrid current drive with opposing ohmic drive on PLT, 8: 45152 (R:US)
Lower Hybrid Heating
Current-drive experiments on the PLT Tokamak, 8: 45148 (R:US)
Lower-hybrid current drive with opposing ohmic drive on PLT, 8: 45152 (R:US)

PLUGS
See CLOSURES

PLUMES
Aerosol Monitoring
Chemical pathways from stack emissions to surface water, 8: 44663 (RA:DK)
Mathematical Models
Plume rise, 8: 44679 (R:DK:In Danish)

PLUTONIUM
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Recovery
Pyrochemical recovery of plutonium fluoride reduction slag, 8: 43358 (R:US)

PLUTONIUM 236
Energy Levels
Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8: 45025 (J:US)

PLUTONIUM 237
Electron Capture Decay
Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8: 45025 (J:US)

PLUTONIUM 239 TARGET
Neutron Reactions
Mass distributions in monoenergetic-neutron-induced fission of ^{239}Pu, 8: 45024 (J:US)

PLUTONIUM CARBIDES
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)

PLUTONIUM DIOXIDE
Fabrication
Fabrication of plutonium fuel for fast neutron reactors, 8: 43800 (R:FR:In French)

PLUTONIUM ISOTOPES
See also PLUTONIUM 236
PLUTONIUM 237
Radioecological Concentration
Plutonium aerosols size distribution in a reprocessing plant, 8: 44700 (RA:DE)

PLUTONIUM OXIDES
See also PLUTONIUM DIOXIDE
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)

PLUTONIUM SULFATES
Chemical Preparation
Synthesis and characterization of bis(μ-hydroxo)tetraaquadiplutonium(IV) sulfate, $Pu_2(OH)_2(SO_4)_3 .4H_2O$, a novel compound containing hydrolyzed plutonium (IV), 8: 44367 (J:US)
Hydrolysis
Synthesis and characterization of bis(μ-hydroxo)tetraaquadiplutonium(IV) sulfate, $Pu_2(OH)_2(SO_4)_3 .4H_2O$, a novel compound containing hydrolyzed plutonium (IV), 8: 44367 (J:US)

PMMA
Combustion
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)

P-N JUNCTIONS
Boundary Conditions
Boundary conditions at grain boundaries, 8: 45067 (J:US)

PNA
See POLYCYCLIC AROMATIC HYDROCARBONS

POINT BEACH-1 REACTOR
Environmental Impacts
Draft environmental statement related to steam-generator repair at Point Beach Nuclear Plant, Unit No. 1. Docket No. 50-266, 8: 43876 (R:US)
Steam Generators
Draft environmental statement related to steam-generator repair at Point Beach Nuclear Plant, Unit No. 1. Docket No. 50-266, 8: 43876 (R:US)
POISEUILLE FLOW
See LAMINAR FLOW
POLAR COMPOUNDS
Binding Energy
Ionic character of polar crystals: An extended Mulliken scheme for electronegativities, 8: 45074 (J:US)
Charge Density
Ionic-charge modification at the surface of polar crystals, 8: 45073 (J:US)
Charge Transport
Ionic character of polar crystals: An extended Mulliken scheme for electronegativities, 8: 45074 (J:US)
POLARIZED BEAMS
Beam Production
Ring-magnetron ionizer for polarized negative-ion sources, 8: 44511 (R:US)
POLICY
See ENERGY POLICY
ENVIRONMENTAL POLICY
GOVERNMENT POLICIES
POLLUTANTS
Not for radioactive contaminants for which use RADIOACTIVE WASTES or other related terminology.
Health Hazards
Health effects studies, 8: 43227 (RA:US)
POLLUTION
See also AIR POLLUTION
NOISE POLLUTION
THERMAL POLLUTION
WATER POLLUTION
Environmental Policy
Cities, states, and national laboratories: an account of productive interaction, 8: 44003 (RA:US)
Monitoring
Nuclear and x-ray techniques, 8: 44662 (RA:US)
POLLUTION CONTROL
Methods of controlling and removing pollution once it has occurred.
See also AIR POLLUTION CONTROL
Budgets
Development of technology for environmental control, 8: 43994 (RA:US)
Research Programs
Energy and Environmental Systems Division, Systems Engineering and Technology Group: program summary, 8: 43541 (R:US)
Environmental pollution control research activities, 8: 43226 (RA:US)
Federal laboratories as centers of excellence in the environmental sciences: a case study, 8: 44002 (RA:US)
Mission and work programs of the Environmental Studies Division of EPA, 8: 43995 (RA:US)
Technology Assessment
Environmental control technology for aqueous effluents, 8: 43237 (RA:US)
Environmental control technology for gaseous emissions, 8: 43238 (RA:US)
Monitoring environmental quality, 8: 43998 (RA:US)
Overview of research in the Environmental Protection Agency, 8: 43992 (RA:US)
POLLUTION CONTROL EQUIPMENT
See also ELECTROSTATIC PRECIPITATORS
SCRUBBERS
SKIMMERS
Performance Testing
Full scale tests with oil recovery systems offshore. Norway, June 1980, 8: 43287 (R:NO)
POLLUTION REGULATIONS
Regulations for nonradioactive pollution only; see also CONTAMINATION REGULATIONS.
Environmental standards, 8: 43993 (RA:US)
POLLUTION (THERMAL)
See THERMAL POLLUTION
POLOIDAL DIVERTOR EXPERIMENT
See PDX DEVICES
POLONIUM 204
Energy Levels
Levels in $_{84}$204 Po from the decay of $_{86}^{204}$At, 8: 45016 (J:US)
POLYACETALS
Absorption Spectra
Optical absorption from polarons in a model of polyacetylene, 8: 44260 (J:US)
Optical Properties
Optical absorption from polarons in a model of polyacetylene, 8: 44260 (J:US)
Polarons
Optical absorption from polarons in a model of polyacetylene, 8: 44260 (J:US)
POLYCRYSTALS
Computer Codes
Texture analysis on the base of incomplete pole figures. Mathematical substantiation and the ICPOFI program description, 8: 45300 (R:SU:In Russian)
Texture
Texture analysis on the base of incomplete pole figures. Mathematical substantiation and the ICPOFI program description, 8: 45300 (R:SU:In Russian)
POLYCYCLIC AROMATIC HYDROCARBONS
Ecological Concentration
Chemical characterization of emmissions from wood-fired stoves, 8: 43510 (R:NO:In Norwegian)
Gas Chromatography
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2 (74 inorganic trace elements and 21 polycyclic aromatic hydrocarbons), 8: 43224 (R:US)
Mass Spectroscopy
Emissions and efficiency performance of industrial-coal-stoker fired boilers: inorganic trace elements and polynuclear aromatic hydrocarbon emissions. Volume 2 (74 inorganic trace elements and 21 polycyclic aromatic hydrocarbons), 8: 43224 (R:US)
Mutagen Screening
Chromosome aberration assays in barley (Hordeum vulgare), 8: 44809 (J:NL)
POLY(ISOBUTYLENE OXIDE)
See EPOXIDES
POLYMERS
See also ELASTOMERS
Uses
Research needs for the use of polymer coatings for corrosion protection, 8: 44136 (R:US)
POLYMETHYLMETHACRYLATES
See PMMA
POLYNUCLEAR AROMATIC HYDROCARBONS
See POLYCYCLIC AROMATIC HYDROCARBONS
POLYPROPYLENE
Pyrolysis
Economic and energy audit of converting waste plastics to oil. Final report, 8: 44102 (R:US)
POLYSTYRENE
Knudsen Flow
Direct measurements of aerosol diffusion constants in the intermediate Knudsen regime, 8: 44909 (J:US)
Light Scattering
Direct measurements of aerosol diffusion constants in the intermediate Knudsen regime, 8: 44909 (J:US)
POLYTETRAFLUOROETHYLENE
Packings
PTFE/aramid packing in boiler feedwater pump saves over $2000/year, 8: 44105 (J:US)
POLYTHIONATES
See SULFUR COMPOUNDS
POLYTHIONIC ACIDS
See SULFUR COMPOUNDS

POLYVINYL CHLORIDE
See PVC
POLY(VINYLIDENE FLUORIDE)
See FLUORINATED ALIPHATIC HYDROCARBONS
POOL TYPE REACTORS
See also ASTRA REACTOR
BER-2 REACTOR
IEAR-1 REACTOR
SLOWPOKE TYPE REACTORS
Neutron Flux
Fast neutron fluxes and spectra in the RBT-6 reactor channels, 8: 43892 (R:SU:In Russian)
Neutron Spectra
Fast neutron fluxes and spectra in the RBT-6 reactor channels, 8: 43892 (R:SU:In Russian)
POROUS MATERIALS
Fluid Flow
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
Heat Flow
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
PORTLAND CEMENT
Mechanical Vibrations
Thermal cycling and vibration response for PREPP concrete waste forms, 8: 43354 (R:US)
Thermal Cycling
Thermal cycling and vibration response for PREPP concrete waste forms, 8: 43354 (R:US)
POSITRON CHANNELING
Photon Emission
Classical theory of relativistic charged particle radiation in crystals, 8: 45047 (RA:SU:In Russian)
POSITRON-ELECTRON-PROTON STORAGE RING
See PEP STORAGE RINGS
POSITRONIUM
Annihilation
Radiative corrections to positronium decay, 8: 44903 (J:US)
POSITRONS
Annihilation
Installation for measuring angular correlation of two-photon annihilation of positrons in a condensed medium, 8: 44576 (R:SU:In Russian)
Positron annihilation studies of molybdenum irradiated by protons, neutrons or electrons, 8: 44227 (BA:NL)
Positron annihilation as a technique for dislocation line studies, 8: 44235 (BA:US)
Diffusion
Positron diffusion in porous materials, 8: 44877 (RA:SU:In Russian)
Lifetime
Positron diffusion in porous materials, 8: 44877 (RA:SU:In Russian)
POTASSIUM
Equations of State
High-pressure equation of state of Li, Na, and K, 8: 44199 (R:US)
Membrane Transport
Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8: 44786 (R:US)
Radioecological Concentration
Background radioactivity from natural occurrences: a preliminary review, 8: 44717 (R:US)
POTASSIUM 39 TARGET
Deuteron Reactions
Study of the sup(39,41)K(d,^{3}He)sup(38,40)Ar reactions at 22.8 MeV, 8: 44999 (J:NL)
POTASSIUM 41 TARGET
Deuteron Reactions
Study of the sup(39,41)K(d,^{3}He)sup(38,40)Ar reactions at 22.8 MeV, 8: 44999 (J:NL)
POTASSIUM CARBONATES
Catalytic Effects
Exxon catalytic coal gasification process and large pilot plant development program, 8: 43154 (RA:US)
Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8: 43170 (R:US)
POTASSIUM CHLORIDES
Argon 40 Reactions
Charged-particle exclusive analysis of central Ar+KCl and Ar+Pb reactions at 1.8 and 0.8 GeV nucleon, 8: 45023 (J:US)
F Centers
Study of an F center in molten KCl, 8: 44358 (R:US)
Physical Radiation Effects
Kinetics of aggregation and annealing of defects in heavily X-irradiated alkali chloride crystals studied by positron annihilation, 8: 44316 (BA:NL)
POTASSIUM COMPOUNDS
See also POTASSIUM CARBONATES
POTASSIUM CHLORIDES
POTASSIUM IODIDES
Catalytic Effects
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
POTASSIUM IODIDES
Raman Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_2/KI-LiI, I_2/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8: 44340 (J:US)
Ultraviolet Spectra
Raman and visible-ultraviolet spectra of polyhalide anions in molten I_2/KI-LiI, I_2/CsCl-LiCl, and I_2-ICl/CsCl-LiCl, 8: 44340 (J:US)
POTTING MATERIALS
Mechanical Properties
Effect of CTBN composition on the properties of clear and filled epoxy adducts, 8: 44450 (R:US)
POULTRY
See FOWL
POWER CONDITIONING CIRCUITS
Performance Testing
Task 4 completion report for 40-kilowatt grid-connected modification contract, 8: 44056 (R:US)
POWER GENERATION
See also COGENERATION
Cost
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)
Information Systems
Electric power production data bank: construction and some details, 8: 44043 (R:NL:In Dutch)
POWER PLANTS
See also HYDROELECTRIC POWER PLANTS
PEAKING POWER PLANTS
SOLAR POWER PLANTS
THERMAL POWER PLANTS
THERMONUCLEAR POWER PLANTS
WIND POWER PLANTS
Noise Pollution Control
Proposals for acoustical requirements of the heating and power industry, 8: 44812 (R:SE:In Swedish)
POWER POOLS
See INTERCONNECTED POWER SYSTEMS
POWER REACTORS
See also ANGRA-1 REACTOR
ANGRA-2 REACTOR
ANGRA-3 REACTOR
BELOYARSK-3 REACTOR
BIG ROCK POINT REACTOR
BUGEY-1 REACTOR
CONNECTICUT YANKEE REACTOR
DRESDEN-1 REACTOR
DRESDEN-2 REACTOR
GINNA-1 REACTOR
HBWR REACTOR
LACBWR REACTOR
MILLSTONE-1 REACTOR
OYSTER CREEK-1 REACTOR
PALISADES-1 REACTOR
POINT BEACH-1 REACTOR
ROBINSON-2 REACTOR
ROWE YANKEE REACTOR
SAN ONOFRE-1 REACTOR
SEABROOK-1 REACTOR
SEABROOK-2 REACTOR

SHIPPINGPORT REACTOR
SPACE POWER REACTORS
STADE REACTOR
THREE MILE ISLAND-2 REACTOR
VK-50 REACTOR

After-Heat
Decay heat calculations with the CEA radioactivity data bank and the code PEPIN, 8: 43837 (R:FR:In French)

Primary Coolant Circuits
Finite element method for an ultra compressible flow, 8: 43853 (R:FR)

Steam Generators
Developing the algorithm and code for calculating an interchannel stability of steam generating channels, 8: 43854 (R:SU:In Russian)

POWER SUPPLIES
See also PHOTOVOLTAIC POWER SUPPLIES
SPACECRAFT POWER SUPPLIES
Electrophysical apparatus. Issue 18. Collection of articles, 8: 45233 (R:SU:RU)
Eletrophysical apparatus. Issue 19. Collection of articles, 8: 45236 (R:SU:RU)

POWER TRANSMISSION
See also UNDERGROUND POWER TRANSMISSION

Control
Corrective switching, 8: 43740 (R:DE:In German)

Feedback
Dynamical network feedback of controlled DC drivings with high performance, 8: 43739 (R:DE:In German)

Load Management
Corrective switching, 8: 43740 (R:DE:In German)

Optimization
Application of process computers for cost-optimal control in power networks, 8: 43741 (R:DE:In German)

Process Computers
Application of process computers for cost-optimal control in power networks, 8: 43741 (R:DE:In German)

Reliability
Calculation of reliability characteristics for electric power supply networks, 8: 43738 (R:DE:In German)

POWER TRANSMISSION LINES

Electric Fields
Power-line-induced AC potential on natural-gas-pipelines for complex rights-of-way configurations. Volume 3. Computer program user's guide. Final report, 8: 43298 (R:US)

Line Losses
Theoretical aspects of ionic loss in transmission lines magnetically insulated against electron loss, 8: 43742 (J:US)

PREFABRICATED BUILDINGS

Attached Greenhouses
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
Passive and hybrid solar heating for manufactured housing, 8: 43566 (RA:US)

Daylighting
Passive/hybrid heating, cooling, and daylighting concepts for commercial/industrial pre-engineered buildings, 8: 43594 (RA:US)

Direct Gain Systems
Passive and hybrid solar manufactured housing and buildings, 8: 43564 (RA:US)
Passive and hybrid solar heating for manufactured housing, 8: 43566 (RA:US)

Passive Solar Cooling Systems
Passive/hybrid heating, cooling, and daylighting concepts for commercial/industrial pre-engineered buildings, 8: 43594 (RA:US)

Passive Solar Heating Systems
Design of passive/hybrid solar systems for manufactured metal buildings for commercial and industrial applications, 8: 43599 (RA:US)
Development of a passive solar design for a manufactured building, 8: 43562 (RA:US)
Overview of Passive Solar Manufactured Buildings and Metro Denver Home Builders programs, 8: 43557 (RA:US)
Passive and hybrid solar manufactured housing and buildings. Phase I, 8: 43565 (RA:US)
Passive/hybrid heating, cooling, and daylighting concepts for commercial/industrial pre-engineered buildings, 8: 43594 (RA:US)
System development: solar home heating, 8: 43561 (RA:US)

Thermal Insulation
Passive and hybrid solar manufactured housing and buildings. Phase I, 8: 43565 (RA:US)

PRESSURE TUBES

Corrosion
Zircaloy behaviour in high temperature irradiated water (CANDU), 8: 43793 (R:CA)

PRESSURE VESSELS

Corrosion Fatigue
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)

Crack Propagation
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Cyclic crack growth in high-temperature water-results of an international testing round robin, 8: 43858 (RA:US)
Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8: 43752 (RA:US)
Fatigue crack growth rates of irradiated pressure vessel steels in simulated nuclear coolant environment, 8: 43781 (RA:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Investigation of fatigue crack growth in SA508-2 in a 288°C PWR environment by a constant ΔK test method, 8: 43780 (RA:US)
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels, 8: 43859 (RA:US)
Subcritical crack growth in underclad region, 8: 44193 (RA:US)

Creep
Mechanical modelling of a structural performance of a pressure vessel submitted to the creep phenomenon, 8: 43857 (R:BR:In Portuguese)

Eddy Current Testing
In-service inspection of reactors (PWR), 8: 43763 (R:FR:In French)

Fatigue
Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8: 43752 (RA:US)
Fatigue crack growth rates of irradiated pressure vessel steels in simulated nuclear coolant environment, 8: 43781 (RA:US)

Fracture Properties
Assessment of fracture toughness of heavy-section steels for nuclear pressure vessels, 8: 43861 (TJ:US)

In-Service Inspection
Qualification of automated techniques for meeting ASME code and NRC requirements (PWR; BWR), 8: 43820 (R:US)

Materials
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

Specifications
Design concept for vessels and heat exchangers, 8: 44383 (R:BR)

Stress Analysis
Mechanical modelling of a structural performance of a pressure vessel submitted to the creep phenomenon, 8: 43857 (R:BR:In Portuguese)

Thermal Stresses
Thermal stresses in a PWR pressure vessel, 8: 43771 (R:BR:In Portuguese)

Ultrasonic Testing
In-service inspection of reactors (PWR), 8: 43763 (R:FR:In French)

Welded Joints
Corrosion fatigue crack growth of pressure vessel welds in PWR environment, 8: 43779 (RA:US)
PRESSURIZED WATER COOLED MODERATED REACTO
See PWR TYPE REACTORS
PRESSURIZED WATER REACTORS
See PWR TYPE REACTORS
PRESSURIZERS
Heat Transfer
New model for simulation of pressurizers in PWR type reactors, 8: 43773 (R:BR:In Portuguese)
Hydraulics
New model for simulation of pressurizers in PWR type reactors, 8: 43773 (R:BR:In Portuguese)
Simulation
New model for simulation of pressurizers in PWR type reactors, 8: 43773 (R:BR:In Portuguese)
PRICES
Prior to June 1979, CHARGES was used.
Forecasting
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Oil supply/demand pricing trends, 8: 44034 (RA:US)
PRIMARY COOLANT CIRCUITS
Heat Transfer
Analytical investigation concerning condensation of steam with low air content (BWR), 8: 43967 (TG:US)
Hydraulics
Analytical investigation concerning condensation of steam with low air content (BWR), 8: 43967 (TG:US)
Finite element method for an ultra compressible flow, 8: 43853 (R:FR)
Magnetic Filters
Development of magnetic filters for the primary-coolant circuit of a PWR, 8: 43788 (R:US)
Pipes
Comparison of NUPIPE-II and SAP IV predicted and experimentally determined dynamic structural responses for German Standard Problem 4a (BWR), 8: 43906 (R:US)
Fracture mechanics evaluation of reactor piping reliability. Pt. 2. Simulation of pipe rupture probability (PWR; BWR), 8: 43966 (BA:NL)
Two-Phase Flow
Finite element method for an ultra compressible flow, 8: 43853 (R:FR)
Water Chemistry
Direct measurement of physical and chemical parameters in reactor circuits at high pressure and temperature of water, 8: 43768 (RA:CS:In Czech)
PRINCETON LARGE TORUS
See PLT DEVICES
PRINTED CIRCUITS
Testing
Insulation-resistance measurements of coated and uncoated printed wiring boards, 8: 44453 (R:US)
PROCESS CONTROL
Integrated plant control: a solution at hand or a research topic for the next decade, 8: 44373 (B:US)
PROCESS HEAT
AECL programs for new applications for nuclear energy, 8: 43832 (R:CA)
Perturbation Theory
Methodology for Monte Carlo geometrical perturbation analysis with application to a process heat fusion blanket, 8: 45282 (J:US)
PROCESS HEAT REACTORS
Economics
60-MW/sub t/ methanation plant design for HTGR process heat, 8: 43833 (R:US)
Methanation
60-MW/sub t/ methanation plant design for HTGR process heat, 8: 43833 (R:US)
Reactor Safety
Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8: 43909 (R:US)
Risk Assessment
Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8: 43909 (R:US)
Specifications
60-MW/sub t/ methanation plant design for HTGR process heat, 8: 43833 (R:US)
PROCESS SOLUTIONS
Water Pollution Control
Method for treating solid substances in original water (Patent), 8: 44746 (TG:US)
PROCESSING (DATA)
See DATA PROCESSING
PRODUCTION (HYDROGEN)
See HYDROGEN PRODUCTION
PROFESSIONAL PERSONNEL
Interagency Cooperation
Workshop reports, 8: 44004 (RA:US)
PROFLAVINE
Biochemical Reaction Kinetics
Impact of cofactors and inhibitors on DNA repair synthesis after γ-irradiation in semi-permeable Escherichia coli cells, 8: 44795 (R:DE:In German)
PROGRAMMING LANGUAGES
Data models and data manipulation languages: complementary semantics and proof theory, 8: 45320 (BA:US)
PROJECTION SPARK CHAMBERS
Data Acquisition Systems
CAMAC interface for TPC data-acquisition electronics, 8: 44620 (R:US)
Equipment Interfaces
CAMAC interface for TPC data-acquisition electronics, 8: 44620 (R:US)
PROJECTORS (SCANNING)
See SCANNING MEASURING PROJECTORS
PROLIFERATION
Government Policies
International non-proliferation regime. An historical overview, 8: 43403 (RA:CA)
PRONGS
See PARTICLE TRACKS
PROPANE
Prices
Petroleum marketing monthly, 8: 43285 (R:US)
Sales
Petroleum marketing monthly, 8: 43285 (R:US)
1,2,3-PROPANETRIOL
See GLYCEROL
1-PROPANOL
See PROPANOLS
2-PROPANOL
See PROPANOLS
PROPANOLS
Ignition Quality
Experimental determination of the adiabatic flame temperature in explosion flames near to the lower inition limit, 8: 44368 (R:DE:In German)
PROPANONE
See ACETONE
PROPENE
See PROPYLENE
PROPYL ALCOHOLS
See PROPANOLS
PROPYLENE
Molecular Structure
Molecular structure of hydrocarbon monolayers on metal surfaces, 8: 44353 (J:US)
PROTACTINIUM
Ion Exchange Chromatography
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B:DE:In German)
PROTECTION
See SAFETY
PROTECTION (CORROSION)
See CORROSION PROTECTION
PROTECTION (RADIATION)
See RADIATION PROTECTION

PROTECTIVE COATINGS
Reviews
Research needs for the use of polymer coatings for corrosion protection, 8: 44136 (R:US)
PROTEINS
Biosynthesis
Brain protein synthesis in normal and demented patients. A study by P.E.T. with ^{11}C-L methionine, 8: 44761 (R:FR)
PROTON BEAMS
Beam Monitors
Measurements of the mean energy of proton beam (approximately 1 GeV) extracted from the LINF synchrocyclotron using the Cherenkov method of double reflections, 8: 44542 (R:SU:In Russian)
Energy Losses
Atomic and nuclear properties of materials, 8: 45048 (R:DE)
Neutron Sources
Rutherford SNS beam experiments, 8: 44527 (RA:DE)
Orbits
Characteristics of transported ion beam in laser-initiated plasma channels, 8: 45110 (R:JP)
PROTON REACTIONS
Capture
Evidence for a secondary doorway state in A = 13 nuclei from unpolarized and polarized capture measurements, 8: 44977 (R:US)
Proton capture to excited states of ^{16}O: M1, E1, and Gamow-Teller transitions and shell model calculations, 8: 44978 (J:US)
Cross Sections
Charged particle reaction cross sections and nucleosynthesis, 8: 44827 (R:AU)
Elastic Scattering
Dirac-equation impulse approximation for intermediate-energy nucleon-nucleus scattering, 8: 44996 (J:US)
sup(90,92)Zr(p vector,p') reactions at Esub(p)=800 MeV, 8: 45009 (J:NL)
Fragmentation
Breakup of spectator residues in relativistic nuclear collisions, 8: 45020 (J:US)
Energy deposition in intermediate-energy nucleon-nucleus collisions, 8: 44989 (J:US)
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Inclusive Interactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Inelastic Scattering
"Wine-bottle" optical potentials and the inelastic scattering of protons near 200 MeV, 8: 44998 (J:NL)
sup(90,92)Zr(p vector,p') reactions at Esub(p)=800 MeV, 8: 45009 (J:NL)
Particle Production
Production of positive pions by 800 MeV protons on carbon, 8: 44986 (J:US)
Pickup Reactions
Microscopic formalism for intermediate energy transfer reactions: Application to the (p,d) and (d,p) reactions, 8: 44979 (J:US)
Time asymmetry: Polarization and analyzing power in the nuclear reactions, 8: 44973 (J:NL:In French)
PROTON RECOIL DETECTORS
Bremsstrahlung
Neutron-proton bremsstrahlung at 4.8 MeV, 8: 45058 (B:ZA)
PROTON-ANTIPROTON INTERACTIONS
Inclusive Interactions
Search for production of narrow p-barp states with a 5-Gev/cp-bar beam, 8: 44925 (J:US)
PROTON-INDUCED X-RAY EMISSION ANALYSIS
See PIXE ANALYSIS
PROTON-PROTON INTERACTIONS
Elastic Scattering
Csub(LL)=(L,L;0,0) measurements and a structure due to a P partial wave in the pp system, 8: 44927 (J:NL)
Particle Production
Multiparticle hadronic systems produced in high-energy (pp) interactions, and comparison with (e^+e^-), 8: 44913 (R:CH)
PROTONS
Backscattering
Computer simulation of the grazing incidence backscattering of protons from a (110) nickel surface, 8: 44860 (RA:SU)
Decay
Exact solution of the Dirac equation in the field of a 't Hooft—p Polyakov monopole, 8: 44956 (J:US)
Particle Production
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
PTFE
See POLYTETRAFLUOROETHYLENE
PUBLIC BUILDINGS
Bead Walls
Analysis of performance of passive solar heated nature center, 8: 43583 (RA:US)
Daylighting
Essex-Dorsey Senior Center, 8: 43592 (RA:US)
Rocks and Trees Community Center, 8: 43607 (RA:US)
Shelly Ridge Program Center building, 8: 43598 (RA:US)
Willow Park II Community Center, 8: 43611 (RA:US)
Direct Gain Systems
Analysis of performance of passive solar heated nature center, 8: 43583 (RA:US)
Rocks and Trees Community Center, 8: 43607 (RA:US)
Energy Conservation
Information manual for the institutional conservation program, 8: 44085 (R:US)
Passive Solar Heating Systems
De Graff Nature Center: passive solar heated park and recreational building, 8: 43605 (RA:US)
Essex-Dorsey Senior Center, 8: 43592 (RA:US)
Shelly Ridge Program Center building, 8: 43598 (RA:US)
Reporting Requirements
Information manual for the institutional conservation program, 8: 44085 (R:US)
Stoves
Russian fireplace: demonstrations and workshops. Final report, January 1, 1980-January 31, 1981, 8: 44084 (R:US)
Ventilation
Essex-Dorsey Senior Center, 8: 43592 (RA:US)
Willow Park II Community Center, 8: 43611 (RA:US)
Wood Burning Furnaces
Rocks and Trees Community Center, 8: 43607 (RA:US)
PULMONARY CANCER
See CARCINOMAS
PULMONARY LAVAGE
See LUNGS
PULSE ANALYZERS
Analog-to-Digital Converters
Digital time-to-code converter, 8: 44575 (RA:SU:In Russian)
Design
Two-parameter "Time-detector's number" analyzer based on a minicomputer for the KDSOG-M neutron spectrometer, 8: 44595 (R:SU:In Russian)
PULSE COLUMNS
See EXTRACTION COLUMNS
PULSED NEUTRON TECHNIQUES
Feasibility Studies
Experimental fast reactors: self-sustained symetric and asymetric oscillations and viability as a source of pushed neutrons, 8: 43888 (RA:BR:In Portuguese)
PULVERIZED FUEL ASH
See FLY ASH
PURITY
See IMPURITIES
PVC
Performance Testing
Use of plastic construction materials in small-scale fuel alcohol production, 8: 43524 (J:US)
PWR TYPE REACTORS
See also ANGRA-1 REACTOR
ANGRA-2 REACTOR
ANGRA-3 REACTOR
CONNECTICUT YANKEE REACTOR
GINNA-1 REACTOR
LOFT REACTOR

PALISADES-1 REACTOR
POINT BEACH-1 REACTOR
ROBINSON-2 REACTOR
ROWE YANKEE REACTOR
SAN ONOFRE-1 REACTOR
SEABROOK-1 REACTOR
SEABROOK-2 REACTOR
SHIPPINGPORT REACTOR
STADE REACTOR
THREE MILE ISLAND-2 REACTOR
WWER TYPE REACTORS

Blowdown
Use of the modal superposition technique for piping system blowdown analyses, 8: 43905 (R:US)

Construction
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)

Containment Buildings
Hydrogen combustion characteristics related to reactor accidents, 8: 43935 (R:US)
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8: 43911 (R:DE:In German)

Containment Systems
Hydrogen-burn analyses of ice-condenser containments, 8: 43942 (R:US)

Decommissioning
Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation, 8: 43756 (R:US)

Decontamination
Decontamination as a precursor to decommissioning. Status report Task 2: process evaluation, 8: 43756 (R:US)

Engineered Safety Systems
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)

Fission Product Release
Secondary emissions from secondary loop of light-water reactors in normal operation and during selected incidents, 8: 43965 (B:DE:In German)

Fuel Assemblies
Irradiation in the CAP reactor of FRAGEMA fuel assemblies under power transients representative of super imposed load follow and remote control regimes, 8: 43762 (R:FR)
Overview of the PBF Severe-Fuel-Damage Program and results of the first test, 8: 43903 (R:US)

Fuel Cans
Experiment operations plan for the MT-3 experiment in the NRU reactor, 8: 43937 (R:US)
Kalman filter-based gap conductance modeling, 8: 43748 (R:US)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description, 8: 43897 (R:GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes, 8: 43898 (R:GB)
UK MT-3 ballooning test in the Battelle NRU loop, 8: 43896 (R:GB)

Fuel Element Failure
UK MT-3 ballooning test in the Battelle NRU loop, 8: 43896 (R:GB)

Fuel Elements
Nuclear-fuel-cycle education: Module 4. Fuel element design, 8: 43746 (R:US)

Fuel Management
Comparative study of fuel management in PWR reactors, 8: 43775 (RA:BR:In Portuguese)
Nuclear-fuel-cycle education: Module 5. In-core fuel management, 8: 43829 (R:US)

Fuel Pellets
Fission gas and iodine release measured in IFA-430 up to 15 GWd/t UO_2 burnup, 8: 43747 (R:US)
Kalman filter-based gap conductance modeling, 8: 43748 (R:US)

Fuel Pins
Post irradiation examination on test fuel pins for PWR, 8: 43770 (R:BR:In Portuguese)

Gaseous Wastes
Iodine determination in a PWR reactor during normal operation, 8: 43874 (R:FR:In French)

In-Service Inspection
In-service inspection of reactors, 8: 43763 (R:FR:In French)

Inspection
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)

Loss of Coolant
Adaptation of TOODEE-2 computer code for reflood analysis in Angra-1 reactor (FLECHT experiments), 8: 43916 (RA:BR:In Portuguese)
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8: 43912 (RA:BR:In Portuguese)
Experiment operations plan for the MT-3 experiment in the NRU reactor, 8: 43937 (R:US)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 1: short description, 8: 43897 (R:GB)
MABEL-2: a code to analyse cladding deformation in a loss-of-coolant accident. Part 3: user notes, 8: 43898 (R:GB)
Modifications of the bubble rise model and heat transfer model used in RELAP 4/Mod 5 computer code for transient analysis (Small break accident), 8: 43915 (RA:BR:In Portuguese)
PWR small-break analysis using a PDP-11/AD10 computer system, 8: 43900 (R:US)
Thermal/Hydraulic Analysis Research Program. Quarterly report, July-September 1982, 8: 43938 (R:US)
UK MT-3 ballooning test in the Battelle NRU loop, 8: 43896 (R:GB)
Using event trees to quantify the effect of post-TMI modifications on PORV-related LOCA probability, 8: 43826 (BA:US)

Loss of Flow
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8: 43912 (RA:BR:In Portuguese)

Meltdown
Hydrogen-burn analyses of ice-condenser containments, 8: 43942 (R:US)

Net Energy
Nuclear-fuel-cycle education: Module 11. Part I. Nuclear fuel cycle economics. Part II. Net energy model of nuclear power. Final report, 8: 43830 (R:US)

Pipes
Experimental damping data for dynamic analysis of nuclear power plant piping systems, 8: 43904 (R:US)
Nuclear power plant piping damping parametric effects, 8: 43907 (R:US)
Use of the modal superposition technique for piping system blowdown analyses, 8: 43905 (R:US)

Pressure Vessels
Corrosion fatigue crack growth of pressure vessel welds in PWR environment, 8: 43779 (RA:US)
In-service inspection of reactors, 8: 43763 (R:FR:In French)
Neutron spectral characterization of the fourth Nuclear Regulatory Commission Heavy Section Steel Technology IT-CT irradiation experiments: dosimetry and uncertainty analysis, 8: 43786 (R:US)
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Qualification of automated techniques for meeting ASME code and NRC requirements, 8: 43820 (R:US)
Thermal stresses in a PWR pressure vessel, 8: 43771 (R:BR:In Portuguese)

Pressurizers
New model for simulation of pressurizers in PWR type reactors, 8: 43773 (R:BR:In Portuguese)

Primary Coolant Circuits
Development of magnetic filters for the primary-coolant circuit of a PWR, 8: 43788 (R:US)
Fracture mechanics evaluation of reactor piping reliability. Pt. 2. Simulation of pipe rupture probability, 8: 43966 (BA:NL)

Quality Assurance
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Reactor Accidents
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)
Development of a computer code for transients simulation in PWR type reactors, 8: 43921 (RA:BR:In Portuguese)
Evaluation of severe accident safety system value based on averting financial risks, 8: 43950 (R:US)
Hydrogen combustion characteristics related to reactor accidents, 8: 43935 (R:US)
Overview of the PBF Severe-Fuel-Damage Program and results of the first test, 8: 43903 (R:US)
The sensitivity of calculated doses to critical assumptions for the offsite consequences of nuclear power reactor accidents, 8: 43964 (BA:US)
Reactor Control Systems
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981, 8: 43873 (R:US)
Estimation of bias shifts in a steam-generator water-level controller, 8: 43869 (R:US)
Reactor Core Disruption
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8: 43899 (R:US)
PWR degraded core analysis, 8: 43929 (R:GB)
Reactor Cores
Pattern recognition method for nuclear reactor core surveillance, 8: 43759 (R:FR:In French)
Reactor Instrumentation
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981, 8: 43873 (R:US)
Pattern recognition method for nuclear reactor core surveillance, 8: 43759 (R:FR:In French)
Reactor Kinetics
Temperature effects studies in light water reactor lattices, 8: 43767 (R:FR:In French)
TRIPOLI.2. A 3D Monte Carlo system for thermal reactor applications, 8: 43758 (R:FR)
Reactor Lattices
Temperature effects studies in light water reactor lattices, 8: 43767 (R:FR:In French)
Reactor Licensing
Applications of PRA in licensing, 8: 43958 (BA:US)
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Regulatory licensing status summary report. Nuclear power plants data for decisions (Blue Book), June 1-June 30, 1983, 8: 43823 (R:US)
Reactor Maintenance
The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory, 8: 43956 (BA:US)
Reactor Materials
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8: 43784 (RA:US)
Fatigue crack growth of low alloy steels in PWR environment, 8: 44182 (RA:US)
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8: 43899 (R:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels, 8: 44180 (RA:US)
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8: 44178 (R:US)
Thermal fatigue crack growth analysis in a nozzle corner, 8: 44192 (RA:US)
Reactor Operation
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Reactor Operators
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)
Reactor Protection Systems
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Reactor Safety
Institutional implications of establishing safety goals for nuclear power plants, 8: 43940 (R:US)
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Light-Water-Reactor Safety-Technology Program. Quarterly report, January-March 1983, 8: 43951 (R:US)
Theoretical investigations of mass- and energy transport in light water reactor containment buildings, 8: 43911 (R:DE:In German)
Reactor Simulators
Implementation of a pressurized water reactor simulator for teaching on a mini-computer, 8: 43761 (R:FR:In French)
PICOLO 2 simulator. Programming and application to teaching, 8: 43760 (R:FR:In French)
Reactor Sites
Reactor siting risk comparisons related to recommendations of NUREG-0625, 8: 43879 (BA:US)
Risk Assessment
Applications of PRA in licensing, 8: 43958 (BA:US)
Evaluation of severe accident safety system value based on averting financial risks, 8: 43950 (R:US)
Initial guidance on digraph-matrix analysis for systems interaction studies, 8: 43939 (R:US)
PWR degraded core analysis, 8: 43929 (R:GB)
Secondary Coolant Circuits
Secondary emissions from secondary loop of light-water reactors in normal operation and during selected incidents, 8: 43965 (B:DE:In German)
Spent Fuel Elements
Generation and vitrification of high-level light water reactor liquid waste, 8: 43391 (J:US)
Steam Generators
Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982, 8: 43785 (R:US)
Estimation of bias shifts in a steam-generator water-level controller, 8: 43869 (R:US)
In-service inspection of reactors, 8: 43763 (R:FR:In French)
Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor, 8: 43772 (R:BR:In Portuguese)
Program for computation of transition processes in the tube bundle of a steam generator module (DINAMO-2), 8: 43765 (R:SU:In Russian)
System Failure Analysis
Initial guidance on digraph-matrix analysis for systems interaction studies, 8: 43939 (R:US)
Thorium Cycle
KFA/NUCLEBRAS R + D program on Th utilization in PWR, 8: 43831 (R:BR)
Transient Overpower Accidents
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code, 8: 43912 (RA:BR:In Portuguese)
Transients
Development of a computer code for transients simulation in PWR type reactors, 8: 43921 (RA:BR:In Portuguese)

PYRAZINES
Energy Transfer
Distance dependence of electronic energy transfer to semiconductor surfaces: $^{3}n\pi$ /sup / pyrazine/GaAs(110), 8: 44306 (J:US)
Phosphorescence
Distance dependence of electronic energy transfer to semiconductor surfaces: $^{3}n\pi$ /sup / pyrazine/GaAs(110), 8: 44306 (J:US)
PYROLYSIS
Catalysts
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
Chemical Reaction Kinetics
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
Research Programs
Entrained flow pyrolysis of biomass, 8: 43435 (RA:US)
PYROLYSIS PRODUCTS
See also CHARS
Mass Spectroscopy
Fundamental pyrolysis studies, 8: 43434 (RA:US)

Q

QATAR
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
QUADRUPOLE LINACS
Summary of the linac discussion group, 8: 44473 (RA:DE)
Beam Currents
Notes on RFQ beam current as a function of vane voltage, sparking limit, aperture and frequency, 8: 44488 (RA:DE)
Beam Dynamics
RFQ development at Los Alamos, 8: 44483 (RA:DE)
Cavity Resonators
Notes on RFQ beam current as a function of vane voltage, sparking limit, aperture and frequency, 8: 44488 (RA:DE)
RFQ development at Frankfurt, 8: 44522 (RA:DE)
Construction
INS RFQ linac 'LITL', 8: 44470 (RA:DE)
Performance
RFQ development at Los Alamos, 8: 44483 (RA:DE)
RF Systems
RFQ development at Frankfurt, 8: 44522 (RA:DE)
QUALITY ASSURANCE
Managerial attitude toward quality assurance, 8: 43744 (R:US)
Environmental Policy
Research problems and issues in the application of land use controls to environmental protection, 8: 43997 (RA:US)
QUANTUM CHROMODYNAMICS
Neutral Currents
Neutral-current effects in quantum-chromodynamic four-jet production, 8: 44940 (J:US)
P Invariance
Neutral-current effects in quantum-chromodynamic four-jet production, 8: 44940 (J:US)
Phonons
Role of the phonon in the quantum-chromodynamical plasma, 8: 44951 (J:US)
QUANTUM ELECTRODYNAMICS
Perturbation Theory
Algebraic description of perturbation theory in quantum electrodynamics, 8: 44949 (R:AU)
QUANTUM FLUIDS
See also HELIUM II
Bibliographies
Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands, 8: 44908 (R:NL)
QUANTUM MECHANICS
Supersymmetry
Aspects of supersymmetric quantum mechanics, 8: 45088 (J:US)
QUANTUM OPERATORS
Matrices
Anomalous dimension matrices of four quark operators, 8: 45082 (R:AU)
QUARK CONFINEMENT
See BAG MODEL
QUARK MODEL
See also BAG MODEL
STRING MODELS
Gluons
Quark model with one-gluon corrections. Radially excited states, 8: 44933 (J:US)
QUARKONIUM
A hypothetical bound state of quark and antiquark.
Decay
Beyond the static limit for quarkonium decays, 8: 44942 (J:US)
Energy Levels
Quarkonium bound states and coupling to hadrons, 8: 44952 (J:US)
Particle Production
Decay of the Higgs boson into heavy-quarkonium states, 8: 44937 (J:US)
QUARKS
Particle Identification
Search for fractional charges, 8: 44924 (J:US)
Particle Production
Production of heavy quarks: A nonperturbative approach, 8: 44945 (J:US)
QUARTZ
Cumulative Radiation Effects
Laser-induced bulk damage in SiO_2 at 1.064, 0.532 and 0.355 μm, 8: 44265 (RA:US)
Multiple-pulse laser-induced bulk damage in crystalline and fused quartz at 1.064 and 0.532 μm, 8: 44264 (RA:US)
Microstructure
Dielectric surface structure change under ion irradiation (2-20 keV H_3^+, D_3^+, He^+ ions), 8: 44268 (RA:SU:In Russian)
Muonium
Double electron-muon resonance experiments on muonium in quartz, 8: 44307 (J:US)
Physical Radiation Effects
Dielectric surface structure change under ion irradiation (2-20 keV H_3^+, D_3^+, He^+ ions), 8: 44268 (RA:SU:In Russian)
Laser-induced bulk damage in SiO_2 at 1.064, 0.532 and 0.355 μm, 8: 44265 (RA:US)
Multiple-pulse laser-induced damage in crystalline and fused quartz. Final report, 8: 44263 (R:US)
Multiple-pulse laser-induced bulk damage in crystalline and fused quartz at 1.064 and 0.532 μm, 8: 44264 (RA:US)

R

R CODES
Benchmarks
The benchmarking of RADTRAN II, 8: 43335 (R:US)
RADIATION BURDEN
See RADIATION DOSES
RADIATION DECONTAMINATION
See DECONTAMINATION
RADIATION DOSES
Age Dependence
Dosimetry of internal emitters, 8: 44802 (J:DE:In English and German)
RADIATION EXPOSURE (DOSES)
See RADIATION DOSES

RADIATION HYGIENE
See RADIATION PROTECTION
RADIATION PROTECTION
Environmental standards, 8: 43993 (RA:US)
Pajarito Plan for Radiation Emergency. Standard operating procedures, 8: 43894 (R:US)
RADIATION PROTECTION LAWS
Annual progress report 1981, 8: 43404 (R:FR:In French)
RADIATION SAFETY
See RADIATION PROTECTION
RADIATION SOURCE IMPLANTS
Biomedical Radiography
Automatic seed identification technique for interstitial implants using three isocentric radiographs, 8: 44778 (J:US)
Spatial Distribution
Automatic seed identification technique for interstitial implants using three isocentric radiographs, 8: 44778 (J:US)
RADIATIONS
Interactions
Exact dynamics of a model for a three-level quantum system interacting with a continuous spectrum, 8: 44886 (J:US)
RADIOACTIVE AEROSOLS
Aerosol Monitoring
Aerosols in nuclear engineering, 8: 44701 (RA:DE:In German)
Characterization of nuclear fuel aerosol by sedimentation, 8: 44702 (RA:DE)
Emission and ambient concentrations of longliving aerosol radionuclides at stade nuclear power plant, 8: 44705 (RA:DE)
Studying a hot particle with radiological methods, 8: 44703 (RA:DE)
Atmospheric Chemistry
Aerosols in nuclear engineering, 8: 44701 (RA:DE:In German)
Diagnostic Techniques
Application of radioactive aerosols in diagnostic techniques of bronchial obstructions in the clinical practice, 8: 44771 (RA:DE:In German)
Filters
Mica nuclear track filters. Production, properties and applications, 8: 44386 (RA:DE)
Particle Size
Plutonium aerosols size distribution in a reprocessing plant, 8: 44700 (RA:DE)
Studying a hot particle with radiological methods, 8: 44703 (RA:DE)
Sampling
Plutonium aerosols size distribution in a reprocessing plant, 8: 44700 (RA:DE)
Simulation
To the resuspension of cerium-IV-oxide powder aggregates and measurement of their mass distribution, 8: 44704 (RA:DE:In German)
RADIOACTIVE GASEOUS WASTES
See GASEOUS WASTES
RADIOACTIVE MATERIALS
Road Transport
Transportation incidents involving Canadian shipments of radioactive material. 1947 - 1978, 8: 44375 (R:CA)
Truck transportation of radioactive materials, 8: 43336 (R:US)
Transport
Generic evaluation of the radiological impacts of transportation in the nuclear fuel cycle, 8: 43334 (R:US)
Transport Regulations
Radioactive material transport, 8: 44374 (R:CA)
RADIOACTIVE PARTICULATES
See RADIOACTIVE AEROSOLS
RADIOACTIVE WASTE DISPOSAL
Alpha-Bearing Wastes
Nuclear-fuel-cycle education: Module 8. Waste management, 8: 43345 (R:US)
Casks
Autoradiography of metallic matrices, 8: 43338 (R:CA)
Financing
Report on financing the disposal of commercial spent nuclear fuel and processed high-level radioactive waste, 8: 43344 (R:US)
Geologic Deposits
Analytical models for thermal rock mechanics, 8: 43392 (B:GB)
Research and development related to the Nevada Nuclear Waste Storage Investigations. Progress report, October 1-December 31, 1982, 8: 43359 (R:US)
High-Level Radioactive Wastes
Analytical models for thermal rock mechanics, 8: 43392 (B:GB)
Nuclear-fuel-cycle education: Module 8. Waste management, 8: 43345 (R:US)
Performance allocation traceable to regulatory criteria as applied to site-characterization work at the Basalt Waste Isolation Project, 8: 43378 (R:US)
Report on financing the disposal of commercial spent nuclear fuel and processed high-level radioactive waste, 8: 43344 (R:US)
Hydraulic Fracturing
Characterization of hydrofracture grouts for radionuclide migration, 8: 43374 (R:US)
Legislation
Information report on state legislation, 8: 43365 (R:US)
Low-Level Radioactive Wastes
Characterization of radionuclide behavior in low level waste sites, 8: 43396 (J:US)
Information report on state legislation, 8: 43365 (R:US)
Nuclear-fuel-cycle education: Module 8. Waste management, 8: 43345 (R:US)
Regional compacting for low-level waste management: an innovative approach in national problem solving, 8: 43351 (R:US)
Measuring Instruments
Geotechnical instrumentation requirements for atdepth testing and repository monitoring in tuff, 8: 43388 (J:US)
Results of instrument reliability study for high-level nuclear waste repositories, 8: 43389 (J:US)
Mill Tailings
Problem of abandoned uranium tailings in northern Saskatchewan. An overview, 8: 43395 (R:CA)
Monitoring
Results of instrument reliability study for high-level nuclear waste repositories, 8: 43389 (J:US)
National Program Plans
National waste terminal storage program: progress and status, 8: 43387 (J:US)
Radionuclide Migration
Data base for a site-specific analysis of the dispersion of radioactive elements from a final repository, 8: 43399 (TG:US)
Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides, 8: 43393 (R:US)
Research Programs
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
Research and development related to the Nevada Nuclear Waste Storage Investigations. Progress report, October 1-December 31, 1982, 8: 43359 (R:US)
Rock Mechanics
Analytical models for thermal rock mechanics, 8: 43392 (B:GB)
Site Selection
Evaluation of geochemical properties used in area-to-location screening for a nuclear waste repository at the Nevada Test Site, 8: 43357 (R:US)
Spent Fuels
Fuel isolation research for the Canadian Nuclear Fuel Waste Management Program, 8: 43337 (R:CA)
Underground Disposal
Biobarriers used in shallow burial ground stabilization, 8: 43390 (J:US)
Characterization of radionuclide behavior in low level waste sites, 8: 43396 (J:US)
RADIOACTIVE WASTE FACILITIES
Actual point about fission products vitrification, 8: 43341 (R:FR:In French)

Cooling
Forced ventilation analysis of a commercial high-level nuclear waste repository in tuff. Topical report RSI-0175, 8: 43382 (R:US)
Financing
Report on financing the disposal of commercial spent nuclear fuel and processed high-level radioactive waste, 8: 43344 (R:US)
Measuring Instruments
Results of instrument reliability study for high-level nuclear waste repositories, 8: 43389 (J:US)
Pilot Plants
Summary of INEL waste reduction/treatment facilities: SWEPP, PREPP, WERF, 8: 43352 (R:US)
Seals
Hydrology of sealing a repository in saturated tuff, 8: 43386 (R:US)
Ventilation
Forced ventilation analysis of a commercial high-level nuclear waste repository in tuff. Topical report RSI-0175, 8: 43382 (R:US)

RADIOACTIVE WASTE MANAGEMENT
Government Policies
Regional compacting for low-level waste management: an innovative approach in national problem solving, 8: 43351 (R:US)
Information Systems
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Legislation
Information report on state legislation, 8: 43365 (R:US)
Low-Level Radioactive Wastes
Information report on state legislation, 8: 43365 (R:US)
Regional compacting for low-level waste management: an innovative approach in national problem solving, 8: 43351 (R:US)
Nondestructive Testing
Automated NDT techniques in radioactive waste management, 8: 43353 (R:US)

RADIOACTIVE WASTE PROCESSING
Alpha-Bearing Wastes
Incinerated waste consolidation studies, 8: 43350 (R:US)
Nuclear-fuel-cycle education: Module 8. Waste management, 8: 43345 (R:US)
Thermal cycling and vibration response for PREPP concrete waste forms, 8: 43354 (R:US)
Denitration
Denitration of simulated fast reactor highly active liquor waste, 8: 43364 (R:GB)
Encapsulation
Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution, 8: 43340 (R:GB)
High-Level Radioactive Wastes
Actual point about fission products vitrification, 8: 43341 (R:FR:In French)
Denitration of simulated fast reactor highly active liquor waste, 8: 43364 (R:GB)
Nuclear-fuel-cycle education: Module 8. Waste management, 8: 43345 (R:US)
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
Inorganic Ion Exchangers
Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution, 8: 43340 (R:GB)
Intermediate-Level Radioactive Wastes
Cement radwaste solidification studies. Third annual report, 8: 43339 (R:GB)
Liquid Wastes
Generation and vitrification of high-level light water reactor liquid waste, 8: 43391 (J:US)
Low-Level Radioactive Wastes
Cement radwaste solidification studies. Third annual report, 8: 43339 (R:GB)
Nuclear-fuel-cycle education: Module 8. Waste management, 8: 43345 (R:US)
Mill Tailings
Research on the characterization and conditioning of uranium mill tailings. Volume 1. I. Characterization and leaching behavior of uranium mill tailings, 8: 43347 (R:US)
Research on the characterization and conditioning of uranium mill tailings. III. Summary of uranium mill tailings conditioning research and implications regarding remedial actions, 8: 43348 (R:US)
Tailings treatment techniques for uranium mill waste: a review of existing information (Neutralization processes, fixation processes, and specific constituent removal), 8: 43366 (R:US)
Organic Ion Exchangers
Encapsulation of spent ion-exchange resins in an epoxide resin. Pt. 1. Effect of γ-irradiation on mechanical properties and gas evolution, 8: 43340 (R:GB)
Solidification
Actual point about fission products vitrification, 8: 43341 (R:FR:In French)
Cement radwaste solidification studies. Third annual report, 8: 43339 (R:GB)
Generation and vitrification of high-level light water reactor liquid waste, 8: 43391 (J:US)
Immobilizing defense waste at the Savannah River Project, 8: 43349 (R:US)
Incinerated waste consolidation studies, 8: 43350 (R:US)
Microstructural characterization of simulated reactor waste forms, 8: 43381 (R:US)
Thermal cycling and vibration response for PREPP concrete waste forms, 8: 43354 (R:US)

RADIOACTIVE WASTE STORAGE
Alpha-Bearing Wastes
Characteristics of transuranic waste at Department of Energy sites, 8: 43377 (R:US)

RADIOAUTOGRAPHY
See AUTORADIOGRAPHY

RADIOBIOLOGICAL EFFECTS
See BIOLOGICAL RADIATION EFFECTS

RADIOCRYSTALLOGRAPHY
See CRYSTALLOGRAPHY

RADIODIAGNOSIS (RADIONUCLIDES)
See NUCLEAR MEDICINE

RADIOGRAPHS
See IMAGES

RADIOGRAPHY (AUTO)
See AUTORADIOGRAPHY

RADIOGRAPHY (BIOMEDICAL)
See BIOMEDICAL RADIOGRAPHY

RADIOIMMUNOASSAY
Optimization
Development and application of radioimmunoassay methods for the serodiagnosis of intrauterine and congenital virus infections, 8: 44780 (B:GB)

RADIOISOTOPE MIGRATION
See RADIONUCLIDE MIGRATION

RADIOISOTOPE SCANNERS
Computerized Control Systems
Operation manual: mini-segmented gamma scanner, 8: 44618 (R:US)

RADIOISOTOPES
Information Systems
Automatic information system for nuclear spectrometric experiments, 8: 44364 (R:SU:In Russian)

RADIOLOGICAL PROTECTION
See RADIATION PROTECTION

RADIOMETRIC ANALYSIS
Surface Barrier Detectors
Application of the arsenide-gallium detectors in X-ray radiometric analysis, 8: 44613 (RA:SU:In Russian)

RADIONUCLIDE MIGRATION
In environment.
Mathematical Models
Ultimate removal mechanisms of elements from the ocean, 8: 44749 (J:GB)

Statistics
TRAN-STAT: (statistics for environmental studies), Number 23, April 1983, 8: 44718 (R:US)
RADIONUCLIDE TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION
RADIONUCLIDES
See RADIOISOTOPES
RADIOPROTECTIVE SUBSTANCES
Efficiency
Effect of some radioprotective and radiosensitizing substances on the semiconservative and unscheduled DNA biosynthesis of rat thymocytes, 8: 44797 (R:DE:In German)
RADIOSENSITIZERS
Efficiency
Effect of some radioprotective and radiosensitizing substances on the semiconservative and unscheduled DNA biosynthesis of rat thymocytes, 8: 44797 (R:DE:In German)
RADIOSURGERY
See RADIOTHERAPY
RADIOTHERAPY
Automatic seed identification technique for interstitial implants using three isocentric radiographs, 8: 44778 (J:US)
RADIUM 226
Biological Radiation Effects
Biological effects of radium, 8: 44799 (R:DE:In German)
Gamma Radiation
Gamma intensities for ^{226}Ra and daughters, and ^{235}U, 8: 45027 (J:NL)
Reviews
Biological effects of radium, 8: 44799 (R:DE:In German)
RADIUM D
See LEAD 210
RADON
Health Hazards
Ventilation, filtration and radon, 8: 44666 (RA:DK:In Danish)
Radioecological Concentration
Radon dosimetry: a review of radon and radon daughter exposure conditions in dwellings and other structures, 8: 44706 (R:US)
Ventilation control by means of CO_2 determination, 8: 44667 (RA:DK:In Swedish)
RADON 222
Radioecological Concentration
Radiation burden in dwelling-houses by radon and its daughter elements, 8: 44698 (RA:AT:In German)
RAFT RIVER VALLEY
Geothermal Power Plants
Raft River binary-cycle geothermal pilot power plant final report, 8: 43662 (R:US)
Geothermal Wells
Deep-drilling data, Raft River geothermal area, Idaho: Raft River geothermal production well No. 4, 8: 43658 (R:US)
Well Logging
Deep-drilling data, Raft River geothermal area, Idaho: Raft River geothermal production well No. 4, 8: 43658 (R:US)
RAILWAYS
Fuel Economy
Identification and condenstion of railway fuel-savings measures and strategies, 8: 44089 (R:US)
RARE EARTH COMPOUNDS
See also CERIUM COMPOUNDS
Critical Field
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4, 8: 44251 (J:US)
Magnetic Susceptibility
Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4, 8: 44251 (J:US)
Magnetization
Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4, 8: 44251 (J:US)
Specific Heat
Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4, 8: 44251 (J:US)
Superconductivity
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4, 8: 44251 (J:US)
Transition Temperature
Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
RARE EARTHS
See also ERBIUM
GADOLINIUM
SAMARIUM
TERBIUM
Extraction Chromatography
Investigations for chromatographic separation and determination of the rare earths and auxiliary group elements, 8: 44325 (R:DE:In German)
Liquid Column Chromatography
Investigations for chromatographic separation and determination of the rare earths and auxiliary group elements, 8: 44325 (R:DE:In German)
Thin-Layer Chromatography
Investigations for chromatographic separation and determination of the rare earths and auxiliary group elements, 8: 44325 (R:DE:In German)
RAS AL KHAIMA
See UNITED ARAB EMIRATES
RAYLEIGH-TAYLOR INSTABILITY
Analytical Solution
Rayleigh-Taylor instability and resulting failure modes of ablatively imploded inertial-fusion targets, 8: 45261 (R:US)
REACTION INTERMEDIATES
Electric Conductivity
Picosecond pulse-conductivity technique applied to study excess-electron reactions in hydrocarbon mixtures, 8: 44359 (R:US)
REACTOR ACCIDENTS
See also FUEL ELEMENT FAILURE
LOSS OF COOLANT
LOSS OF FLOW
MELTDOWN
REACTOR CORE DISRUPTION
TRANSIENT OVERPOWER ACCIDENTS
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)
Cost
Evaluation of severe accident safety system value based on averting financial risks (PWR; BWR), 8: 43950 (R:US)
Environmental Impacts
Applications of nuclear accident consequence models, 8: 43962 (BA:US)
Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department, 8: 43881 (BA:US)
The sensitivity of calculated doses to critical assumptions for the offsite consequences of nuclear power reactor accidents, 8: 43964 (BA:US)
Fires
Hydrogen combustion characteristics related to reactor accidents (PWR; BWR), 8: 43935 (R:US)
Heat Transfer
Overview of the PBF Severe-Fuel-Damage Program and results of the first test (PWR), 8: 43903 (R:US)
Hydraulics
Overview of the PBF Severe-Fuel-Damage Program and results of the first test (PWR), 8: 43903 (R:US)
Pressure Gradients
Hydrogen combustion characteristics related to reactor accidents (PWR; BWR), 8: 43935 (R:US)
Probability
Probabilistic methods for identification of significant accident sequences in loop-type LMFBRs, 8: 43941 (R:US)
Radiation Hazards
Applications of nuclear accident consequence models, 8: 43962 (BA:US)
Methodology and practical basis for emergency planning in case of accidental releases, 8: 43880 (BA:US)

Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department, 8: 43881 (BA:US)
The sensitivity of calculated doses to critical assumptions for the offsite consequences of nuclear power reactor accidents, 8: 43964 (BA:US)

Reactivity
Use of thermal time constant concept in the analysis of reactivity induced accidents with feedback, 8: 43914 (RA:BR)

Risk Assessment
Applications of nuclear accident consequence models, 8: 43962 (BA:US)
Offsite consequence modelling of atmospheric releases: present practice at the CEA/Nuclear Safety Department, 8: 43881 (BA:US)
Probabilistic methods for identification of significant accident sequences in loop-type LMFBRs, 8: 43941 (R:US)
The sensitivity of calculated doses to critical assumptions for the offsite consequences of nuclear power reactor accidents, 8: 43964 (BA:US)

Simulation
Development of a computer code for transients simulation in PWR type reactors, 8: 43921 (RA:BR:In Portuguese)

REACTOR CELLS

Disadvantage Factor
Calculation of the thermal disadvantage factor for a reactor cell with anisotropic scattering by the Fn method, 8: 43846 (RA:BR:In Portuguese)

Neutron Diffusion Equation
Scattering anisotropy and neutron leakage in a reactor lattice, 8: 43838 (R:FR:In French)

Neutron Flux
Technique and the DAR and FINDIF codes for one-dimensional calculation of reactor cells with opportunity of account for discontinuous boundary conditions, 8: 43841 (R:SU:In Russian)

Reactor Kinetics
Calculation of the thermal disadvantage factor for a reactor cell with anisotropic scattering by the Fn method, 8: 43846 (RA:BR:In Portuguese)

REACTOR COMPONENTS

See also BREEDING BLANKETS
FUEL ELEMENTS
REACTOR CORES

Mechanical Vibrations
Review of leakage-flow-induced vibrations of reactor components (LMFBR), 8: 43798 (R:US)

Risk Assessment
Probability problems in seismic risk analysis and load combinations for nuclear power plants, 8: 43952 (R:US)

Seismic Effects
Probability problems in seismic risk analysis and load combinations for nuclear power plants, 8: 43952 (R:US)

Stress Analysis
Consensus estimation study of nuclear power plant structural loads, 8: 43944 (R:US)
First-excursion problems for Gaussian vector processes, 8: 43943 (R:US)

REACTOR CONTROL SYSTEMS

Data Acquisition Systems
Microprocessor-based power control data acquisition system, 8: 43872 (R:IL:In Hebrew)

Failures
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981 (PWR; BWR), 8: 43873 (R:US)

Flow Regulators
Estimation of bias shifts in a steam-generator water-level controller, 8: 43869 (R:US)

Microprocessors
Microprocessor-based power control data acquisition system, 8: 43872 (R:IL:In Hebrew)

On-Line Control Systems
Design of multivariable controller for a 600 MWe CANDU nuclear power plant., 8: 43868 (R:CA)

REACTOR CONTROL THEORY

See REACTOR KINETICS

REACTOR CORE DISRUPTION
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures (PWR; BWR), 8: 43899 (R:US)

Fission Product Release
PWR degraded core analysis, 8: 43929 (R:GB)

Radioactivity Transport
PWR degraded core analysis, 8: 43929 (R:GB)

REACTOR CORES

See also HETEROGENEOUS REACTOR CORES

Design
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)

Isotope Ratio
Technique and computer code for calculating the isotope composition change in one-dimensional homogeneous reactor, 8: 43839 (R:SU:In Russian)

Mechanical Vibrations
Pattern recognition method for nuclear reactor core surveillance (PWR), 8: 43759 (R:FR:In French)

Monitoring
Pattern recognition method for nuclear reactor core surveillance (PWR), 8: 43759 (R:FR:In French)

Reactivity Worths
Recent developments in the central worth discrepancy, 8: 43817 (R:US)

Specifications
Accelerator breeder with uranium, thorium target, 8: 43836 (R:US)
FBR and RBR particle bed space reactors, 8: 43818 (R:US)

REACTOR FUEL ELEMENTS

See FUEL ELEMENTS

REACTOR FUELS

See NUCLEAR FUELS

REACTOR INSTRUMENTATION

Failures
Common-cause fault rates for instrumentation and control assemblies. Estimates based on Licensee Event Reports at US commercial nuclear power plants, 1976-1981 (PWR; BWR), 8: 43873 (R:US)

REACTOR KINETICS
TRIPOLI.2. A 3D Monte Carlo system for thermal reactor applications (PWR), 8: 43758 (R:FR)

Computer Calculations
Calculation of the thermal disadvantage factor for a reactor cell with anisotropic scattering by the Fn method, 8: 43846 (RA:BR:In Portuguese)

Computer Codes
Utility subroutine package used by Applied Physics Division export codes, 8: 43797 (R:US)

Cross Sections
Sensitivity analysis of U^{238} cross sections in fast nuclear systems-SENSEAV-R computer code, 8: 43806 (RA:BR:In Portuguese)

Finite Element Method
Solution of two energy-group neutron diffusion equation by triangular elements (EFTDN (triangular finite elements in neutron diffusion equation), Fortran IV), 8: 43845 (RA:BR:In Portuguese)
Synthesis method with finite elements for diffusion calculations, 8: 43847 (RA:BR:In Portuguese)

Group Constants
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8: 43842 (R:XA)

Integral Cross Sections
Calculation of integral parameters sensitivity in fast reactors, 8: 43807 (RA:BR:In Portuguese)

Neutron Diffusion Equation
Technique and the DAR and FINDIF codes for one-dimensional calculation of reactor cells with opportunity of account for discontinuous boundary conditions, 8: 43841 (R:SU:In Russian)

Neutron Reactions
Energy yield calculation constant preparation in the ARAMAKO system, 8: 43840 (R:SU:In Russian)
Sensitivity analysis of U^{238} cross sections in fast nuclear systems-SENSEAV-R computer code, 8: 43806 (RA:BR:In Portuguese)
Neutron Spectra
Measured spectra of neutrons escaping from iron spheres, 8: 43852 (R:CS)
Perturbation Theory
Calculation of integral parameters sensitivity in fast reactors, 8: 43807 (RA:BR:In Portuguese)
Power Density
Energy yield calculation constant preparation in the ARAMAKO system, 8: 43840 (R:SU:In Russian)
Sensitivity Analysis
Calculation of integral parameters sensitivity in fast reactors, 8: 43807 (RA:BR:In Portuguese)
Slow Neutrons
Spectral analysis of some problems for neutron thermalization, 8: 43851 (R:SU:In Russian)
Steady-State Conditions
Solution of two energy-group neutron diffusion equation by triangular elements (EFTDN (triangular finite elements in neutron diffusion equation), Fortran IV), 8: 43845 (RA:BR:In Portuguese)
Temperature Coefficient
Temperature effects studies in light water reactor lattices, 8: 43767 (R:FR:In French)

REACTOR LATTICES
Neutron Leakage
Scattering anisotropy and neutron leakage in a reactor lattice, 8: 43838 (R:FR:In French)
Temperature Coefficient
Temperature effects studies in light water reactor lattices, 8: 43767 (R:FR:In French)

REACTOR MAINTENANCE
Human Factors
The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory, 8: 43956 (BA:US)
Risk Assessment
The nuclear power plant maintenance personnel reliability prediction (NPP/MPRP) effort at Oak Ridge National Laboratory, 8: 43956 (BA:US)

REACTOR MATERIALS
To be assigned in conjunction with the specific descriptor for the material used in a reactor, provided this descriptor is not yet up-posted to reactor materials.
See also NUCLEAR FUELS
Chemical Composition
Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9 (LMFBR), 8: 43802 (R:US)
Corrosion
Development of the installation for zirconium alloy corrosion testing in superheated steam flow in a reactor channel, 8: 43792 (R:SU:In Russian)
Zircaloy behaviour in high temperature irradiated water (CANDU), 8: 43793 (R:CA)
Corrosion Fatigue
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Crack growth studies on a carbon steel in oxygenated high-pressure water at elevated temperatures, 8: 44189 (RA:US)
Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8: 43784 (RA:US)
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels, 8: 43859 (RA:US)
Some thoughts on establishing design and inspection codes for corrosion fatigue, 8: 44187 (RA:US)
Crack Propagation
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Crack growth studies on a carbon steel in oxygenated high-pressure water at elevated temperatures, 8: 44189 (RA:US)
Crack initiation and crack growth at the inner nozzle corner surface under thermal shock loading, 8: 44191 (RA:US)
Device for investigating subcritical crack growth of RPV steel specimens under BWR conditions, 8: 43755 (RA:US)
Fatigue crack growth of low alloy steels in PWR environment, 8: 44182 (RA:US)
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels, 8: 44180 (RA:US)
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8: 44178 (R:US)
Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels, 8: 43859 (RA:US)
Subcritical crack growth in underclad region, 8: 44193 (RA:US)
Thermal fatigue crack growth analysis in a nozzle corner, 8: 44192 (RA:US)
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8: 44188 (RA:US)
Creep
Radiation hardening and creep of metals, 8: 44163 (RA:SU:In Russian)
Fatigue
Fatigue crack growth of low alloy steels in PWR environment, 8: 44182 (RA:US)
Fracture Properties
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels, 8: 44180 (RA:US)
Proceedings of the International Atomic Energy Agency specialists' meeting on subcritical crack growth. Sessions III, IV, and V, 8: 44178 (R:US)
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8: 44188 (RA:US)
Hardness
Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9 (LMFBR), 8: 43801 (R:US)
Heat Treatments
Effect of austenitizing and tempering heat treatments on the carbide precipitation in the alloy HT-9 (LMFBR), 8: 43802 (R:US)
Impact Strength
Effects of austenitizing and tempering heat treatments on the impact energy of alloy HT-9 (LMFBR), 8: 43801 (R:US)
Materials Testing
Device for studying dimensional changes of reactor materials during irradiation in accelerators, 8: 44159 (RA:SU:In Russian)
Use of notched compact tension tests for crack initiation design rules in high-temperature water environments, 8: 44188 (RA:US)
Neutron Spectra
Measured spectra of neutrons escaping from iron spheres, 8: 43852 (R:CS)
Oxidation
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures (PWR; BWR), 8: 43899 (R:US)

Physical Radiation Effects
Device for studying dimensional changes of reactor materials during irradiation in accelerators, 8: 44159 (RA:SU:In Russian)
Radiation hardening and creep of metals, 8: 44163 (RA:SU:In Russian)
Representation of the simulation irradiation project (LMFBR), 8: 44171 (RA:DE:In German)
Simulation irradiation of binary copper alloys (LMFBR), 8: 44168 (RA:DE:In German)
Simulation irradiation of segregation-hardening Al and Ni alloys (LMFBR), 8: 44170 (RA:DE:In German)
Study of radiation damage in nuclear- and thermonuclear materials using accelerators, 8: 44162 (RA:SU:In Russian)
Swelling behavior of ferrites and austenites exposed to heavy ions (LMFBR), 8: 44169 (RA:DE:In German)
Swelling
Swelling behavior of ferrites and austenites exposed to heavy ions (LMFBR), 8: 44169 (RA:DE:In German)
Thermal Fatigue
Thermal fatigue crack growth analysis in a nozzle corner, 8: 44192 (RA:US)
Thermal Shock
Crack initiation and crack growth at the inner nozzle corner surface under thermal shock loading, 8: 44191 (RA:US)

REACTOR OPERATORS
Performance
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)
Fault trees and the impact of human variability on probabilistic risk analysis, 8: 43901 (R:US)
Training
Assistance to operators of nuclear power plants in Europe in emergency situations, 8: 43955 (BA:US)

REACTOR PHYSICS
Use only for indexing articles of very broad coverage, such as annual reviews, text book, etc.
Meetings
2. national meeting of reactor physics, 8: 43843 (R:BR:In Portuguese)

REACTOR PROTECTION SYSTEMS
Performance Testing
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Seismic Effects
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)
Stress Analysis
Dynamic qualification of safety-related equipment, 8: 43902 (R:US)

REACTOR SAFETY
Annual progress report 1981, 8: 43404 (R:FR:In French)
Safety considerations for light-water-reactor nuclear power plants: a Swedish perspective, 8: 43947 (R:US)
Calculation Methods
Improved iterative method for solution of fully implicit thermal-hydraulics equations, 8: 45278 (J:US)
Legal Aspects
Institutional implications of establishing safety goals for nuclear power plants (PWR; BWR), 8: 43940 (R:US)
Regulations
Institutional implications of establishing safety goals for nuclear power plants (PWR; BWR), 8: 43940 (R:US)
Research Programs
Light-Water-Reactor Safety-Technology Program. Quarterly report, January-March 1983, 8: 43951 (R:US)

REACTOR SIMULATORS
Implementation of a pressurized water reactor simulator for teaching on a mini-computer, 8: 43761 (R:FR:In French)
PICOLO 2 simulator. Programming and application to teaching (PWR), 8: 43760 (R:FR:In French)

REACTOR SITES
Population Density
Tracking population density as a function of time and radial distance using the CLEAR model to simulate an emergency evacuation, 8: 43948 (R:US)
Risk Assessment
Determination of seismic reference motions on nuclear sites in France, 8: 43875 (R:FR:In French)
Methodology and practical basis for emergency planning in case of accidental releases, 8: 43880 (BA:US)
Reactor siting risk comparisons related to recommendations of NUREG-0625, 8: 43879 (BA:US)

REACTOR SITING
See SITE SELECTION

REACTOR START-UP
Computer Codes
A one-dimensional hybrid code for FRM startup, 8: 45281 (J:US)

REACTOR TECHNOLOGY
Management
Swiss Federal Institute for Reactor Research. 1981 annual report, 8: 43834 (R:CH:GE)
Research Programs
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
Swiss Federal Institute for Reactor Research. 1981 annual report, 8: 43834 (R:CH:GE)

REAL TIME SYSTEMS
Structural Models
Investigation into the organisation and structural design of multi-computer process-control systems, 8: 44633 (R:ZA)
Systems Analysis
Investigation into the organisation and structural design of multi-computer process-control systems, 8: 44633 (R:ZA)

RECEPTORS
Binding Energy
Binding of the rat liver thyroid hormone nuclear receptor to deoxyribonucleic acid using a gel filtration assay, 8: 44803 (B:ZA)
Biological Localization
In vivo study of the dopaminergic receptors in the brain of man using ^{11}C-pimozide and positron emission tomography, 8: 44763 (R:FR)

RECLAMATION
See LAND RECLAMATION

RECORDED INFORMATION
See INFORMATION

RECORDS RETRIEVAL
See INFORMATION RETRIEVAL

RECYCLE (FUEL)
See FUEL CYCLE

REDOX FUEL CELLS
Auxiliary Systems
Electrochemical rebalance cell for Redox systems, 8: 44057 (R:US)

REDUCTIVE PERTURBATION METHOD
See PERTURBATION THEORY

REEFS
Construction
Ocean disposal and construction with stabilized coal waste blocks, 8: 43196 (RA:DK)
Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8: 43197 (RA:DK)

REFINING
Comparative Evaluations
Fuel quality/processing study. Volume I. Overview and results (Comparison of ~ 600 feasible paths from fossil fuel sources to electrical power and acceptable exhaust gas), 8: 43174 (R:US)
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Cost
Fuel quality/processing study. Volume I. Overview and results (Comparison of ~ 600 feasible paths from fossil fuel sources to electrical power and acceptable exhaust gas), 8: 43174 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)

Economics
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Energy Efficiency
Fuel quality/processing study. Volume I. Overview and results (Comparison of ~ 600 feasible paths from fossil fuel sources to electrical power and acceptable exhaust gas), 8: 43174 (R:US)
Feasibility Studies
Fuel quality/processing study. Volume I. Overview and results (Comparison of ~ 600 feasible paths from fossil fuel sources to electrical power and acceptable exhaust gas), 8: 43174 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)
Reviews
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)

REFRACTORIES
Comparative Evaluations
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Fatigue
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Service Life
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Thermal Shock
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

REFRIGERATING MACHINERY
Cryopump operations with the tokamak neutral beam injector prototype, 8: 45274 (BA:US)

REFRIGERATORS
On-Line Control Systems
Microprocessor control system for large helium liquefier, 8: 44388 (R:SU:In Russian)

REFUSE
See SOLID WASTES

REFUSE-FUELED POWER PLANTS
Cogeneration
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
District Heating
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
Feasibility Studies
Evaluation of potential for electrical generation using solid waste as fuel in the Pacific Northwest, 8: 44108 (R:US)

REGION IX
See FEDERAL REGION IX

REGION VIII
See FEDERAL REGION VIII

REGION X
See FEDERAL REGION X

REGRESSION ANALYSIS
Statistics
TRAN-STAT (statistics for environmental studies) Number 20, May 1982, 8: 45308 (R:US)

REINFORCED MATERIALS
Stresses
Stresses and deformations in laminated test specimens of carbon fiber reinforced composites, 8: 44257 (R:DE)

RELATIVISTIC BEAM INJECTION
Computerized Simulation
Computer simulations of reflex E-beam systems and plasma, 8: 45124 (RA:CS)
Ionization
Simulation of ionization front forming at injection of relativistic electron beam in a gas chamber, 8: 44549 (R:SU:In Russian)

RELATIVISTIC PLASMA
Parametric Instabilities
Kinetic theory of parametric resonance in relativistic plasma, 8: 45108 (R:XA)

RELEASE (FISSION PRODUCT)
See FISSION PRODUCT RELEASE

REMOTE SENSING
Technology Assessment
Remote sensing for environmental protection, 8: 44000 (RA:US)
Remote sensing of the environment, 8: 44661 (RA:US)
Technology Utilization
Remote sensing for environmental protection, 8: 44000 (RA:US)

RENEWABLE ENERGY SOURCES
See also BIOMASS
GEOTHERMAL ENERGY
SOLAR ENERGY
WIND POWER
Long-term energy sources, 8: 44053 (B:DE:In German)
Research Programs
Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982, 8: 44051 (R:US)

RESERVOIR ENGINEERING
Computerized Simulation
BETA3A user' s manual, 8: 43274 (R:NO)
BETAPLOT user' s manual, 8: 43275 (R:NO)

RESERVOIR FLUIDS
Equations of State
Winfrith PVT Package, 8: 43291 (R:GB)
Thermodynamic Properties
Winfrith PVT Package, 8: 43291 (R:GB)

RESIDENCES
See HOUSES

RESIDENTIAL BUILDINGS
See also APARTMENT BUILDINGS
HOUSES
MOBILE HOMES
Attached Greenhouses
Monitoring and design study of the White Mountain School hybrid solar building, 8: 43581 (RA:US)
Comparative Evaluations
Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar, 8: 43641 (RA:US)
Energy Conservation
Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar, 8: 43641 (RA:US)
Energy conservation in buildings, 8: 44077 (R:NL:In Dutch)
Passive Solar Cooling Systems
Southern Solar Energy Center Passive Buildings Program, 8: 43555 (RA:US)
Passive Solar Heating Systems
Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar, 8: 43641 (RA:US)
Sunup: a dormitory for Colorado Rocky Mountain School, 8: 43635 (RA:US)
Passive Solar Water Heaters
Sunup: a dormitory for Colorado Rocky Mountain School, 8: 43635 (RA:US)
Photovoltaic Power Supplies
Sunup: a dormitory for Colorado Rocky Mountain School, 8: 43635 (RA:US)
Thermal Insulation
Comparison of utility impacts for three types of residential building designs - conventional, energy conserving, and passive solar, 8: 43641 (RA:US)
Wind Turbines
Sunup: a dormitory for Colorado Rocky Mountain School, 8: 43635 (RA:US)
Wood Burning Furnaces
Sunup: a dormitory for Colorado Rocky Mountain School, 8: 43635 (RA:US)

RESIDENTIAL SECTOR
Energy Management
Homemaker energy management. Final report, 8: 44113 (R:US)
RESIDUAL FUEL OIL
See RESIDUAL FUELS
RESIDUAL FUELS
Prices
Petroleum marketing monthly, 8: 43285 (R:US)
Sales
Petroleum marketing monthly, 8: 43285 (R:US)
RESIDUAL STRESSES
Measuring Methods
University of California participation in the CIRP round robin of residual-stress measurement, 8: 44443 (R:US)
RESIDUES
See also ASHES
Gasification
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
SRC-I technology and its economics, 8: 43150 (RA:US)
RESIDUUMS
See RESIDUAL FUELS
RESISTIVITY (ELECTRIC)
See ELECTRIC CONDUCTIVITY
RESONANCE CAVITIES
See CAVITY RESONATORS
RESONANCE INTEGRALS
Computer Calculations
Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis, 8: 43849 (R:DE)
RESOURCE CONSERVATION
Environmental Policy
Cities, states, and national laboratories: an account of productive interaction, 8: 44003 (RA:US)
RESOURCE DEVELOPMENT
Cost
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
RESOURCE RECOVERY FACILITIES
Economic Impact
Energy and economic development in Lawrence, Massachusetts. Summary report, Volume II, 8: 44110 (R:US)
RESPIRABLE DUSTS
See DUSTS
RETORTED SHALES
See SPENT SHALES
RETORTS
Roofs
Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8: 43305 (R:US)
RETROFITTING
Calculation Methods
Commercialization of coal-water slurries - II, 8: 43259 (RA:US)
Economic Analysis
New England Electric coal conversion experience, 8: 43729 (RA:US)
Environmental Effects
New England Electric coal conversion experience, 8: 43729 (RA:US)
Feasibility Studies
Irvington Generating Station coal conversion project, 8: 43727 (RA:US)
New England Electric coal conversion experience, 8: 43729 (RA:US)
REVERSE-FIELD PINCH
Adiabatic Compression Heating
Adiabatic compression of elongated field-reversed configurations, 8: 45182 (J:US)
Plasma Instability
Suppression of the n = 2 rotational instability in field-reversed configurations, 8: 45185 (J:US)
R-F MASS SPECTROMETERS
See DYNAMIC MASS SPECTROMETERS
RHENIUM
Fermi Level
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8: 44197 (R:US)
RHENIUM ALLOYS
Physical Radiation Effects
Atomic-resolution study of homogeneous radiation-induced precipitation in a neutron-irradiated W-10 at. % Re alloy. MSC report No. 5014, 8: 44129 (R:US)
Positron interaction with radiation defects in W-Re alloys (50 MeV gamma radiation), 8: 44164 (RA:SU:In Russian)
RHINE RIVER
Hydroelectric Power
Energy from Meuse and Rhine. A systematic analysis, 8: 43542 (R:NL:In Dutch)
RHODIUM
Fermi Level
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8: 44197 (R:US)
RHODIUM 96
Beta-Plus Decay
Excited states of ^{96}Ru, 8: 45005 (J:US)
RHODIUM BORIDES
Auger Electron Spectroscopy
Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8: 44246 (J:US)
Chemical Bonds
Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8: 44245 (J:US)
Critical Field
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Type-II to type-I transition in superconducting, sputtered ErRh$_4$B$_4$ films, 8: 44250 (J:US)
Electronic Structure
Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8: 44246 (J:US)
Magnetic Properties
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8: 44242 (R:US)
Neutron-diffraction study of the magnetic ordering in superconducting TmRh$_4$B$_4$, 8: 44253 (J:US)
Magnetic Susceptibility
Crystal field effects in RERh$_4$B$_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Magnetization
Crystal field effects in RERh$_4$B$_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
Observation of a first-order phase transition in single-crystal ErRh$_4$B$_4$ at H/sub c/2, 8: 44247 (J:US)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Neutron Diffraction
Neutron-diffraction study of the magnetic ordering in superconducting TmRh$_4$B$_4$, 8: 44253 (J:US)
Phase Transformations
Observation of a first-order phase transition in single-crystal ErRh$_4$B$_4$ at H/sub c/2, 8: 44247 (J:US)
Specific Heat
Crystal field effects in RERh$_4$B$_4$ compounds (RE = rare earth), 8: 44256 (J:GB)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Superconductivity
Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8: 44245 (J:US)
Effect of superconductivity on spin dynamics in (Y/sub 1-x/R/sub x/)Rh$_4$B$_4$, 8: 44252 (J:US)
Investigation of the occurrence of superconductivity below the antiferromagnetic transition in Ho(Ir/sub 0.7/Rh/sub 0.3/)$_4$B$_4$, 8: 44249 (J:US)
Low-temperature investigation of magnetic order and superconductivity in the pseudoternary system Ho(Rh/sub 1-x/Ir/sub x/)$_4$B$_4$, 8: 44242 (R:US)

Neutron-diffraction study of the magnetic ordering in superconducting $TmRh_4B_4$, 8: 44253 (J:US)
Observation of a first-order phase transition in single-crystal $ErRh_4B_4$ at H/sub c/2, 8: 44247 (J:US)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh_4B_4, 8: 44251 (J:US)
Transition Temperature
Crystal field effects in $RERh_4B_4$ compounds (RE = rare earth), 8: 44256 (J:GB)

RHODOPSEUDOMONAS
Immobilized Cells
Seawater-based hydrogen production by immobilized marine photosynthetic bacteria, 8: 43418 (J:US)

RINGOTRON
See ELECTRON-RING ACCELERATORS

RINGS (STORAGE)
See STORAGE RINGS

RISER CRACKING
See COAL LIQUEFACTION

RISK ASSESSMENT
Evaluation of severe accident safety system value based on averting financial risks (PWR; BWR), 8: 43950 (R:US)
Safety-risk assessment of the HTGR steam-cycle/cogeneration plant, 8: 43909 (R:US)
Data Analysis
Suggestions concerning the use of failure data, 8: 44445 (R:NO)
Human Factors
Fault trees and the impact of human variability on probabilistic risk analysis, 8: 43901 (R:US)
Mathematical Models
Denpendency models and probability of joint events, 8: 44444 (R:NO)
Political Aspects
Risks of energy systems, 8: 44007 (R:NL:In Dutch)

RIVERS
See also NIAGARA RIVER
RHINE RIVER
Geometry
Heuristic method for measurement and characterization of river meander wavelength, 8: 44814 (R:US)
Radionuclide Migration
Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors, 8: 44747 (R:DE:In German)

ROAD TRANSPORT
Accidents
Transportation incidents involving Canadian shipments of radioactive material. 1947 - 1978, 8: 44375 (R:CA)

ROADS
Planning
Road and environment, 8: 44754 (R:DE:In German)

ROBERT E. GINNA-1 REACTOR
See GINNA-1 REACTOR

ROBINSON-2 REACTOR
Chemical Effluents
Concentration and distribution of copper in effluents from the H.B. Robinson Steam Electric Plant, 8: 43877 (R:US)

ROCK CAVERNS
Heat Storage
Solubility of rocks and minerals in hot water. The chemical changes of water on heat storage in caverns, 8: 43972 (R:SE:In Swedish)

ROCK SALT
See SALT DEPOSITS

ROCK-FLUID INTERACTIONS
Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides, 8: 43393 (R:US)

ROCKS
Explosive Fracturing
Simulation of rock blasting with the SHALE code, 8: 43302 (R:US)
Heat Storage
Rockstore. A plant for seasonal storage of heat, 8: 43975 (R:SE:In Swedish)
Rock-Fluid Interactions
Solubility of rocks and minerals in hot water. The chemical changes of water on heat storage in caverns, 8: 43972 (R:SE:In Swedish)

ROCKY FLATS PLANT
Personnel
Case-control study of brain tumors among white males employed at the Rocky Flats Plant, 8: 44800 (R:US)

ROCKY MOUNTAIN REGION
See FEDERAL REGION VIII

RODENTS
See also GUINEA PIGS
Biomass
Ecological characteristics of small mammals on a radioactive waste disposal area in southeastern Idaho, 8: 43397 (J:US)
Population Density
Ecological characteristics of small mammals on a radioactive waste disposal area in southeastern Idaho, 8: 43397 (J:US)
Species Diversity
Ecological characteristics of small mammals on a radioactive waste disposal area in southeastern Idaho, 8: 43397 (J:US)

RODS (FUEL)
See FUEL RODS

ROOF PONDS
Commercialization
Skytherm natural thermal control design, production, and commercialization, 8: 43617 (RA:US)
Design
Skytherm natural thermal control design, production, and commercialization, 8: 43617 (RA:US)
Evaporative Cooling
Cool pool: a passive cooling system, 8: 43614 (RA:US)
Performance
Cool pool: a passive cooling system, 8: 43614 (RA:US)
Performance evaluation of a passively heated and cooled solar house, 8: 43616 (RA:US)
Testing
Skytherm natural thermal control design, production, and commercialization, 8: 43617 (RA:US)

ROOFS
Stability
Oil-shale program. Twenty-seventh and twenty-eighth quarterly reports, July 1982-December 1982, 8: 43305 (R:US)

ROPER RESONANCE
See N-1470 RESONANCES

ROTARY DRILLING
Bench-Scale Experiments
Experimental studies on drilling with roller bits in a deep-drilling test bench at a rotational speed of 50 min^{-1} to 150 min^{-1}, 8: 44391 (R:DE:In German)

ROWE YANKEE REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
Reactor Operation
Integrated Plant Safety Assessment: Systematic Evaluation Program. Yankee Nuclear Power Station, Yankee Atomic Electric Company, Docket No. 50-29. Final report, 8: 43931 (R:US)
Reactor Safety
Integrated Plant Safety Assessment: Systematic Evaluation Program. Yankee Nuclear Power Station, Yankee Atomic Electric Company, Docket No. 50-29. Final report, 8: 43931 (R:US)

RUBELLA VIRUS
See MEASLES VIRUS

RUBEOLA VIRUS
See MEASLES VIRUS

RUBIDIUM 82
Beta Decay
Collective excitations of ^{82}Kr observed by in-beam and decay spectroscopy and their characterization by the interacting boson model, 8: 45001 (J:US)

RUBIDIUM CHLORIDES
Physical Radiation Effects
Kinetics of aggregation and annealing of defects in heavily X-irradiated alkali chloride crystals studied by positron annihilation, 8: 44316 (BA:NL)

RUHR 100 GASIFICATION PROCESS
Flowsheets
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
Pilot Plants
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
Thermal Efficiency
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
Waste Heat Utilization
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)
RUNAWAY ELECTRONS
Particle Production
Radio-frequency wave enhanced runaway production rate, 8: 45179 (J:US)
RURAL AREAS
Technology Utilization
Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves, 8: 44014 (J:GB)
Wood Burning Appliances
Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves, 8: 44014 (J:GB)
RUTHENIUM 96
Energy Levels
Excited states of ^{96}Ru, 8: 45005 (J:US)
RUTHENIUM ALLOYS
Physical Radiation Effects
Structural changes observed in (Mosub(.6)Rusub(.4))sub(x)Bsub(1-x) amorphous alloys observed with positron annihilation, 8: 44231 (BA:NL)
RUTHENIUM BORIDES
Auger Electron Spectroscopy
Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8: 44246 (J:US)
Chemical Bonds
Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8: 44245 (J:US)
Electronic Structure
Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8: 44246 (J:US)
Superconductivity
Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8: 44245 (J:US)
RUTHENIUM COMPLEXES
Electrophoresis
Cationic ruthenium-nitrosyl complexes in radioactive waste solutions, 8: 44331 (B:DE:In German)
Excited States
Theoretical model for the luminescing excited states of Ru(bpy)$_3^{2+}$ and Os(bpy)$_3^{2+}$ (bpy = 2,2'-bipyridine), 8: 44334 (R:US)
Photochemical Reactions
Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983, 8: 44356 (R:US)
Solvent Extraction
Cationic ruthenium-nitrosyl complexes in radioactive waste solutions, 8: 44331 (B:DE:In German)
RYDBERG STATES
Prior to April 1981, this concept was indexed to RYDBERG CORRECTION.
Stark Effect
Coherent Stark levels in beam-foil—excited fast Rydberg atoms, 8: 44900 (J:US)

S

SACCHAROMYCES CEREVISIAE
Immobilized Cells
Maximizing microbial cell loading in immobilized-cell systems, 8: 43462 (J:US)
Metabolism
Shift in metabolism towards ethanol production in Saccharomyces cerevisiae by addition of metabolic inhibitors, 8: 43466 (J:US)
Shift in metabolism towards ethanol production in Saccharomyces cerevisiae using alterations of the physical-chemical microenvironment, 8: 43467 (J:US)
SACCHAROSE
Chemical Reactions
Studies on the reaction of nitric acid and sugar, 8: 44354 (J:US)
SAFE LOW POWER CRITICAL EXPERIMENT
See SLOWPOKE TYPE REACTORS
SAFEGUARDS
See also IAEA SAFEGUARDS
Nuclear-fuel-cycle education: Module 9. Safeguards, 8: 43402 (R:US)
Measuring Instruments
Safeguards instrumentation: past, present, future, 8: 43414 (J:US)
SAFETY
For general aspects of safety and protection of personnel.
See also REACTOR SAFETY
Research Programs
Space nuclear-safety program. Progress report, January 1983, 8: 43417 (R:US)
SAFETY (NUCLEAR)
See RADIATION PROTECTION
SAFETY (REACTOR)
See REACTOR SAFETY
SALINE ZONE
See OIL SHALES
SALINITY GRADIENT POWER PLANTS
Feasibility Studies
Energy from Meuse and Rhine. A systematic analysis, 8: 43542 (R:NL:In Dutch)
SALMONELLA TYPHIMURIUM
Biological Radiation Effects
Radiation-induced mutagenicity and lethality in Salmonella typhimurium, 8: 44787 (R:US)
SALT DEPOSITS
Boreholes
In-situ behaviour of salt from closure of deep boreholes (Vacherie and Rayburn's salt domes in Louisiana), 8: 44823 (BA:CA)
Creep
In-situ behaviour of salt from closure of deep boreholes (Vacherie and Rayburn's salt domes in Louisiana), 8: 44823 (BA:CA)
Special problems in making geotechnical measurements in salt, 8: 44820 (J:US)
Stresses near waste canisters buried in salt, 8: 43383 (R:US)
Geology
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume II, 8: 43372 (R:US)
Quaternary geology of Vacherie salt dome, north Louisiana salt dome basin. Volume I, 8: 43371 (R:US)
Information Systems
Data reference and retrieval system for Richton Dome, Mississippi: annual status report for fiscal year 1982, 8: 44813 (R:US)
Overburden
Preliminary overburden characterization at Richton Dome, 8: 43373 (R:US)
Shaft Excavations
Exploratory shaft conceptual design report: Paradox Basin, 8: 43368 (R:US)

Exploratory shaft conceptual design report: Gulf Interior Region salt domes (Richton, Vacherie, Cypress domes), 8: 43369 (R:US)
Exploratory shaft conceptual design report: Permian Basin, 8: 43370 (R:US)
Stresses
Stresses near waste canisters buried in salt, 8: 43383 (R:US)
Working Conditions
Investigation of stress of man caused by work and climate in salt mining, 8: 43400 (R:DE:In German)
SAMARIUM
Sputtering
Velocity measurements of neutral sputtered particles by means of a Doppler shift laser spectrometer, 8: 44847 (RA:SU)
SAMARIUM 152 TARGET
Pion Reactions
High resolution studies of pion-nucleus reaction mechanism, 8: 44975 (R:US)
SAMPLERS
System for obtaining high-integrity borehole fluid samples. National Uranium Resource Evaluation, 8: 43313 (R:US)
SAN ONOFRE-1 REACTOR
Legal Aspects
Systematic Evaluation Program. Status summary report, 8: 43822 (R:US)
SANDSTONES
Fracture Mechanics
Strain behavior of a granite and a graywacke sandstone in tension, 8: 44822 (J:US)
Hydraulic Fracturing
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
Resource Assessment
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
Resource Development
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
Strains
Strain behavior of a granite and a graywacke sandstone in tension, 8: 44822 (J:US)
SATURABLE CORE MAGNETOMETERS
See FLUXGATE MAGNETOMETERS
SAUDI ARABIA
Government Policies
Oil supply/demand pricing trends, 8: 44034 (RA:US)
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
SAVANNAH RIVER PLANT
Personnel Dosimetry
Beta dosimetry at a nuclear fuel separation facility, 8: 44789 (R:US)
Radioactive Waste Processing
Immobilizing defense waste at the Savannah River Project, 8: 43349 (R:US)
SCALAR FIELDS
Diffusion
Two-dimensional, steady-state diffusion of a passive scalar in a flow field, 8: 44950 (J:US)
SCALAR MESONS
Strong-Coupling Model
Static-bag-source meson field theory: Strong-coupling approximation, 8: 44935 (J:US)
SCANDINAVIA
See also DENMARK
NORWAY
SWEDEN
Acid Rain
Fishery status and water quality in areas affected by acid deposition, 8: 44734 (RA:DK)
Water Quality
Fishery status and water quality in areas affected by acid deposition, 8: 44734 (RA:DK)
SCANDIUM
De Haas-Van Alphen Effect
de Haas—van Alphen effect in Sc metal, 8: 44212 (J:US)
Neutron Diffraction
Location of deuterium in α-scandium, 8: 44203 (J:US)
SCANDIUM COMPOUNDS
See also SCANDIUM SILICIDES
Lattice Parameters
Location of deuterium in α-scandium, 8: 44203 (J:US)
Neutron Diffraction
Location of deuterium in α-scandium, 8: 44203 (J:US)
SCANDIUM SILICIDES
Specific Heat
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
Superconductivity
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
SCANNING MEASURING PROJECTORS
On-Line Measurement Systems
Special program-controlled processor of the MELAS system and its software, 8: 44570 (R:SU:In Russian)
SCHOOL BUILDINGS
Attached Greenhouses
Monitoring and design study of the White Mountain School hybrid solar building, 8: 43581 (RA:US)
Daylighting
Design of a passive solar multi-use addition for St. Mary's School, 8: 44062 (RA:US)
Southwest Woodbridge Elementary School, 8: 43600 (RA:US)
Direct Gain Systems
Design of a passive solar multi-use addition for St. Mary's School, 8: 44062 (RA:US)
Passive Solar Heating Systems
Development of a passive solar design for a manufactured building, 8: 43562 (RA:US)
Passive solar Alaskan school, 8: 43591 (RA:US)
Roof Ponds
Southwest Woodbridge Elementary School, 8: 43600 (RA:US)
Thermal Mass
Southwest Woodbridge Elementary School, 8: 43600 (RA:US)
Trombe Walls
Design of a passive solar multi-use addition for St. Mary's School, 8: 44062 (RA:US)
SCHOOL FACILITIES
See EDUCATIONAL FACILITIES
SCHOOL PLANT
See EDUCATIONAL FACILITIES
SCHOOLS
See EDUCATIONAL FACILITIES
SCRAP METALS
Recycling
Chlorine-extraction processes for energy-conserving recovery of nonferrous metals, 8: 44104 (R:US)
SCRUBBERS
See also DRY SCRUBBERS
Chemical Effluents
Seawater scrubber effluent - an evaluation of possible ecological consequences, 8: 43199 (RA:DK)
Testing
Sulfate aerosols from western low-rank coal-fired boilers with FGD: summary of tests at Coal Creek, Clay Boswell, Milton R. Young, and San Miguel stations. MRI-83-FR-1849, 8: 43213 (R:US)
SEA BED
Heat Transfer
Subseabed Disposal Program In-Situ Heat Transfer Experiment (ISHTE), 8: 43380 (R:US)
SEA LEVEL
Variations
Long-term trends in dynamic height and sea surface temperature, 8: 44727 (R:US)

SEABROOK-1 REACTOR
Reactor Licensing
Safety-evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444, 8: 43933 (R:US)
Reactor Safety
Safety-evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444, 8: 43933 (R:US)
SEABROOK-2 REACTOR
Reactor Licensing
Safety-evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444, 8: 43933 (R:US)
Reactor Safety
Safety-evaluation report related to the operation of Seabrook Station, Units 1 and 2. Docket Nos. 50-443 and 50-444, 8: 43933 (R:US)
SEALS
Fabrication
New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report, 8: 43664 (R:US)
Testing
New fluorocarbon elastomers for seals for geothermal and other aggressive environments. Final report, 8: 43664 (R:US)
SEAS
See also ATLANTIC OCEAN
Carbon Cycle
Invasion of fossil-fuel CO_2 into the ocean, 8: 44729 (R:US)
SEAWATER
Radionuclide Migration
Ultimate removal mechanisms of elements from the ocean, 8: 44749 (J:GB)
SECONDARY RECOVERY
See ENHANCED RECOVERY
SEDIMENTS
Chemical Analysis
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
Chemical Composition
Historical changes in acid precipitation and heavy metals deposition originating from fossil fuel combustion in Eastern North America as revealed by Lake Sediment geochemistry, 8: 44736 (RA:DK)
Radioactivity
Direct analysis of ^{210}Pb in sediment samples: Self-absorption corrections, 8: 44719 (J:NL)
Radionuclide Migration
Ultimate removal mechanisms of elements from the ocean, 8: 44749 (J:GB)
Sampling
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
SEEDS
Environmental Transport
Model for the dispersal of seeds by animals, 8: 44713 (R:US)
SEISMIC EVENTS
Data Compilation
Common data base experiment: revised event bulletin, 8: 44653 (R:SE)
SELENIUM
Adsorption
Selenium sorption on a Columbia River basalt, 8: 44819 (R:US)
Desorption
Selenium sorption on a Columbia River basalt, 8: 44819 (R:US)
SEMICONDUCTOR COUNTERS
See SEMICONDUCTOR DETECTORS
SEMICONDUCTOR DETECTORS
See also CDTE SEMICONDUCTOR DETECTORS
HGI2 SEMICONDUCTOR DETECTORS
SI SEMICONDUCTOR DETECTORS
SURFACE BARRIER DETECTORS
Amplitude spectra formation in the GaAs radiation detectors, 8: 44616 (RA:SU:In Russian)
Cadmium telluride detector crystals, alloyed by chlorine, 8: 44612 (RA:SU:In Russian)
SEMICONDUCTOR MATERIALS
If possible index also the specific compounds.
See also MAGNETIC SEMICONDUCTORS
Auger Effect
Auger electrons in the energy spectra of ion-electron emission (Ni, Cu, Mo, Ta, Si, GaAs), 8: 44870 (RA:SU:In Russian)
Charge Carriers
Carrier multiplication in semiconductors induced by the absorption of high-intensity CO_2 laser light, 8: 44298 (J:US)
Electrical Properties
Electrical and optical properties of amorphous thin films, 8: 43527 (BA:US)
Electronic Structure
Position-dependent effective masses in semiconductor theory, 8: 45069 (J:US)
Grain Boundaries
Boundary conditions at grain boundaries, 8: 45067 (J:US)
Ion Implantation
Formation and rearrangement of radiation defects in ion implanted semiconductors (Na, P, B, As, Ar, H_2 ions of 40 to 50 keV range), 8: 44275 (RA:SU:In Russian)
Laser Radiation
Carrier multiplication in semiconductors induced by the absorption of high-intensity CO_2 laser light, 8: 44298 (J:US)
Optical Properties
Electrical and optical properties of amorphous thin films, 8: 43527 (BA:US)
Physical Radiation Effects
Formation and rearrangement of radiation defects in ion implanted semiconductors (Na, P, B, As, Ar, H_2 ions of 40 to 50 keV range), 8: 44275 (RA:SU:In Russian)
Secondary Emission
Auger electrons in the energy spectra of ion-electron emission (Ni, Cu, Mo, Ta, Si, GaAs), 8: 44870 (RA:SU:In Russian)
SEMICONDUCTOR RESISTORS
Electrical Properties
Effect of oxidizing and reducing atmospheres at elevated temperatures on the electrical properties of zinc oxide varistors, 8: 44459 (J:US)
SEMICONDUCTOR STORAGE DEVICES
Physical Radiation Effects
Comparison of analytical models and experimental results for single-event upset in CMOS SRAMs, 8: 44628 (R:US)
SENIOR CENTERS
See PUBLIC BUILDINGS
SERI
See SOLAR ENERGY RESEARCH INSTITUTE
SEWAGE SLUDGE
Anaerobic Digestion
Kinetics and advanced digester design for anaerobic digestion of water hyacinth and primary sludge, 8: 43447 (J:US)
SHAFT EXCAVATIONS
Design
Exploratory shaft conceptual design report: Paradox Basin, 8: 43368 (R:US)
Exploratory shaft conceptual design report: Permian Basin, 8: 43370 (R:US)
SHALE OIL
Chemical Composition
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Chemical Properties
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Heterocyclic Compounds
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Physical Properties
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate, 8: 43157 (RA:US)
Refining
Fuel quality/processing study. Volume I. Overview and results, 8: 43174 (R:US)

Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)

SHARJA
See UNITED ARAB EMIRATES

SHEATHS (FUEL)
See FUEL CANS

SHELLS
Structural forms; for electron shells in atoms use ELECTRONIC STRUCTURE.
Elasticity
Quasi-estatic and dynamic elasto/viscoplastic analysis of plates and shells, 8: 44384 (R:BR:In Portuguese)
Plasticity
Lower bounds of collapse loads in axisymmetrical vessels, 8: 44380 (R:BR:In Portuguese)
Quasi-estatic and dynamic elasto/viscoplastic analysis of plates and shells, 8: 44384 (R:BR:In Portuguese)
Stability
Stability calculations for cylindrical shells and folded systems using the method of finite elements, 8: 44392 (R:DE:In German)

SHIELDING
Neutron Transport
Neutron streaming through straight and single bend slots, 8: 45255 (R:US)
Welding
Use of fusion-welding techniques in fabrication of a superconducting-magnet thermal-shield system, 8: 45262 (R:US)

SHIFT PROCESSES
Catalysts
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)

SHIPPINGPORT PRESSURIZED WATER REACTOR
See SHIPPINGPORT REACTOR

SHIPPINGPORT REACTOR
Reactor Operation
Quarterly operating report, first quarter 1983, 8: 45764 (R:US)

SHOTFIRING
See EXPLOSIVE FRACTURING

SHUTTERS
Fabrication
Rigid interior thermal window shutter, 8: 44065 (RA:US)
Solar Reflectors
Reflective insulating blinds for window applications, 8: 43630 (RA:US)
Thermal Insulation
Reflective insulating blinds for window applications, 8: 43630 (RA:US)

SI SEMICONDUCTOR DETECTORS
Fabrication
Surface-barrier detectors made of silicon doped by phosphorus in thermal neutron flux, 8: 44589 (R:SU:In Russian)
Layers
Definition of the structure layers of semiconductor detectors by means of charged particles, 8: 44594 (R:SU:In Russian)
Performance Testing
Definition of the structure layers of semiconductor detectors by means of charged particles, 8: 44594 (R:SU:In Russian)

SIALON
See ALUMINIUM OXIDES

SIEMENS COMPUTERS
Information Retrieval
Use of 'Direct File Organization' for 'Current Awareness'-Services, 8: 45322 (R:AT:In German)

SIGMA MINUS
Particle Production
Σ Hypernuclei, 8: 44926 (J:US)

SILANES
Electrical Properties
Mass spectrometric studies of impurities in silane and their effects on the electronic properties of hydrogenated amorphous silicon, 8: 44288 (J:US)
Mass Spectroscopy
Mass spectrometric studies of impurities in silane and their effects on the electronic properties of hydrogenated amorphous silicon, 8: 44288 (J:US)

SILICA
Catalytic Effects
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Physical Radiation Effects
Radiation induced defects in high dispersed silicon dioxide irradiated in the nuclear reactor at low temperatures, 8: 44278 (RA:SU:In Russian)
Radiant Heat Transfer
Radiative heat transfer in fibrous insulations: Part 1: Analytical study, 8: 44437 (J:US)

SILICON
Carrier Lifetime
Energy dependence of the carrier mobility-lifetime product in hydrogenated amorphous silicon, 8: 44302 (J:US)
Carrier Mobility
Energy dependence of the carrier mobility-lifetime product in hydrogenated amorphous silicon, 8: 44302 (J:US)
Charged-Particle Transport
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
Compression
Valence-electron density in silicon under high pressure, 8: 44305 (J:US)
Crystal Defects
Laser annealing of disordered regions in silicon, 8: 44274 (RA:SU)
Radiation-induced defects in silicon and germanium. Secondary emission investigation method (1-10 keV ions of Na, Ar, Kr, Xe for Ge irradiation; 50-100 keV ions of B, N, O, P for Si irradiation), 8: 44271 (RA:SU:In Russian)
Crystal Doping
Process research of non-CZ silicon material. Low-cost solar-array project: cell and module formation research area. Quarterly report No. 5, March 1, 1983-May 31, 1983, 8: 43495 (R:US)
Dehydrogenation
Energy dependence of the carrier mobility-lifetime product in hydrogenated amorphous silicon, 8: 44302 (J:US)
Electrical Properties
Mass spectrometric studies of impurities in silane and their effects on the electronic properties of hydrogenated amorphous silicon, 8: 44288 (J:US)
Electron Density
Valence-electron density in silicon under high pressure, 8: 44305 (J:US)
Ion Collisions
Energy spectra and charge states for H and He backscattered from Si in the energy range of 1.5-10 keV, 8: 44853 (RA:SU)
Multiple scattering of 57 keV ^{32}P in Si, 8: 44875 (RA:SU)
Surface scattering of MeV He^+ ions from W(100) and Si(100) monocrystals, 8: 44856 (RA:SU)
Ion Implantation
Distribution of paramagnetic centers and implanted atoms produced in Si by ^{235}U fission fragments, 8: 44270 (RA:SU:In Russian)
Formation and rearrangement of radiation defects in ion implanted semiconductors (Na, P, B, As, Ar, H_2 ions of 40 to 50 keV range), 8: 44275 (RA:SU:In Russian)
Spatial distributions of energy deposited by heavy ions into nuclear collisions, 8: 44269 (RA:SU)
Substitutional placement of phosphorus in ion implanted silicon by recrystallizing amorphous/crystalline interface, 8: 44299 (J:US)
Mass Spectroscopy
Mass spectrometric studies of impurities in silane and their effects on the electronic properties of hydrogenated amorphous silicon, 8: 44288 (J:US)
Mass spectrometric analysis of silicon for solar cells, 8: 44323 (R:DE:In German)

Optical Properties
Optical functions of silicon between 1.7 and 4.7 eV at elevated temperatures, 8: 44292 (J:US)
Oxidation
High-resolution electron-microscopy studies of native oxide on silicon, 8: 44283 (R:US)
Physical Radiation Effects
Formation and rearrangement of radiation defects in ion implanted semiconductors (Na, P, B, As, Ar, H_2 ions of 40 to 50 keV range), 8: 44275 (RA:SU:In Russian)
Laser annealing of disordered regions in silicon, 8: 44274 (RA:SU)
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
Radiation-induced defects in silicon and germanium. Secondary emission investigation method (1-10 keV ions of Na, Ar, Kr, Xe for Ge irradiation; 50-100 keV ions of B, N, O, P for Si irradiation), 8: 44271 (RA:SU:In Russian)
Quantum Efficiency
Permanent damage effects in Si and AlGaAs/GaAs photodiodes, 8: 44315 (J:US)
Semiconductor Junctions
Intrinsic interface states as extended deep traps: Ge/GaP and Si/GaP, 8: 44291 (J:US)
Stacking Faults
Dechanneling by extended defects, 8: 44148 (RA:SU)

SILICON 28
Giant Resonance
Alpha capture into the giant quadrupole resonance in ^{28}Si, 8: 44992 (J:US)

SILICON 28 TARGET
Oxygen 16 Reactions
Optical potential description of $^{16}O+^{28}Si$ elastic scattering, 8: 44991 (J:NL)
Photonuclear Reactions
Photoneutron cross sections for the silicon isotopes, 8: 44993 (J:US)

SILICON 29 TARGET
Photonuclear Reactions
Photoneutron cross sections for the silicon isotopes, 8: 44993 (J:US)

SILICON 30 TARGET
Photonuclear Reactions
Photoneutron cross sections for the silicon isotopes, 8: 44993 (J:US)

SILICON ALLOYS
Amorphous State
Doppler broadening measurements on stable metallic glasses at temperatures near Tsub(g), 8: 44232 (BA:NL)

SILICON CARBIDES
Erosion
Surface erosion of silicon carbide under helium ion bombardment, 8: 44277 (RA:SU:In Russian)
Physical Radiation Effects
Surface erosion of silicon carbide under helium ion bombardment, 8: 44277 (RA:SU:In Russian)
Powder Metallurgy
Further development and production of silicon carbide powders for pressureless sintering, 8: 44241 (R:DE:In German)
Processing
Further development and production of silicon carbide powders for pressureless sintering, 8: 44241 (R:DE:In German)
Sintering
Further development and production of silicon carbide powders for pressureless sintering, 8: 44241 (R:DE:In German)
Synthesis
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)

SILICON COMPOUNDS
See also SILANES, SILOXANES and SILICONES.
See also SILANES
SILICON CARBIDES
SILICON FLUORIDES
SILICON OXIDES
Chemical Preparation
Silane surface chemistry of palladium: synthesis of silaethylene, silacyclobutadiene, and silabenzene, 8: 44339 (J:US)

SILICON FLUORIDES
Chemical Reactions
Gaseous ion reactions in SiF_4 and SiF_4—D_2 mixtures, 8: 44337 (J:US)

SILICON HYDRIDES
See SILANES

SILICON OXIDES
See also QUARTZ
SILICA
Microstructure
High-resolution electron-microscopy studies of native oxide on silicon, 8: 44283 (R:US)

SILICON SEMICONDUCTOR DETECTORS
See SI SEMICONDUCTOR DETECTORS

SILICON SOLAR CELLS
Crystal Doping
Glass diffusion source for constraining BSF region of a solar cell, 8: 43512 (P:US)
Electric Contacts
Development of metallization process: FSA project, cell and module formation research area. Quarterly technical progress report No. 6329-12 for the period ending March 31, 1983, 8: 43496 (R:US)
Fabrication
Glass diffusion source for constraining BSF region of a solar cell, 8: 43512 (P:US)
Research Programs
Review of research on polycrystalline-silicon solar cells, 8: 43508 (R:US)
Reviews
Review of research on polycrystalline-silicon solar cells, 8: 43508 (R:US)
Technology Assessment
Photovoltaic cell and module status, 8: 43498 (RA:US)

SILVER
Aerosol Generators
Aerosol generator for monodisperse Ag- and NaCl-aerosols in the particle size range between 2 nm and 300 nm, 8: 44676 (RA:DE)
Carbon 12 Reactions
Calendar of high multiplicity ^{12}C induced reactions in Ag (Br), 8: 45000 (R:SE)
Electron Collisions
Radiative decay of surface plasmons on nonspherical silver particles, 8: 44837 (R:US)
Kaon Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Pion Plus Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Proton Reactions
Experimental study of the A dependence of inclusive hadron fragmentation, 8: 44922 (J:US)
Reflectivity
Reflectance spectra and dielectric functions for Ag in the region of interband transitions, 8: 44219 (J:US)
Sputtering
Negative-ion formation efficiency in sputtering surfaces activated by an alkali metal, 8: 44865 (RA:SU)
Stimulated Emission
Radiative decay of surface plasmons on nonspherical silver particles, 8: 44837 (R:US)

SILVER ALLOYS
Sputtering
Sputtering yields for two-phase Ag-Cu thin film alloys, 8: 44846 (RA:SU)

SILVER IODIDES
Crystal-Phase Transformations
Structural transitions in superionic conductors, 8: 45076 (J:US)

SIMULATORS (REACTOR)
See REACTOR SIMULATORS

SINGLE CELL PROTEIN
Production
Conversion of henequen pulp to microbial biomass by submerged fermentation, 8: 43521 (J:US)
SINGLE CRYSTALS
See MONOCRYSTALS
SITE SELECTION
Mathematical Models
Sandia nuclear power plant siting study, 8: 43961 (BA:US)
Risk Assessment
Sandia nuclear power plant siting study, 8: 43961 (BA:US)
SITES (REACTOR)
See REACTOR SITES
SKELETON
Neutron Dosimetry
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
Radionuclide Kinetics
Evaluation of energy spectral information in nuclear imaging and investigation of protein binding of radiogallium. Progress report, October 1, 1980-November 30, 1983, 8: 44767 (R:US)
Radiopharmaceuticals
Application of technetium-99m-phosphate isomers in nuclear medicine. A comparative study, 8: 44779 (B:ZA:In Afrikaans)
SKIMMERS
Performance Testing
Full scale tests with oil recovery systems offshore. Norway, June 1980, 8: 43287 (R:NO)
SKYRME POTENTIAL
Effective Skyrme-type interaction for the calculation of nuclear structures of the whole mass table, 8: 45029 (R:BE:In Dutch)
SLAGS
Environmental Impacts
Water pollution arising from solid waste (coal, fly ash, slag) disposal, and measures to prevent water pollution, 8: 44739 (RA:DK)
Leaching
Coal conversion solid waste disposal, 8: 43221 (J:US)
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Waste Disposal
Coal conversion solid waste disposal, 8: 43221 (J:US)
SLOW NEUTRONS
Neutron Spectra
Spectral analysis of some problems for neutron thermalization, 8: 43851 (R:SU:In Russian)
SLOWPOKE TYPE REACTORS
Reactor Kinetics
Dynamic simulation of the 2 MWt slowpoke heating reactor, 8: 43796 (R:CA)
Transients
Dynamic simulation of the 2 MWt slowpoke heating reactor, 8: 43796 (R:CA)
SLUDGES
See also SEWAGE SLUDGE
Leaching
Studies on the leaching and weathering processes of coal ashes, 8: 43201 (RA:DK)
Marine Disposal
Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8: 43197 (RA:DK)
Radiosterilization
Applications of nuclear and applied techniques in public health and pollution control. Proceedings, 8: 44005 (R:IN)
Waste Product Utilization
Ocean disposal of consolidated spray dryer flue gas desulfurization wastes, 8: 43197 (RA:DK)
SLUGS (FUEL)
See FUEL RODS
SLURRIES (FUEL)
See FUEL SLURRIES
SMALL BUSINESSES
Constraints
Small business energy regulation project. Final report, 8: 44032 (R:US)
SMALL-SCALE HYDROELECTRIC POWER PLANTS
Operation
Salt River Project South Consolidated Hydroelectric Generating Station. DOE Small-Scale Hydroelectric Demonstration Program. First annual operating report, September 1, 1981 to August 31, 1982, 8: 43476 (R:US)
SMOKATRON
See ELECTRON-RING ACCELERATORS
SMP DEVICES
See SCANNING MEASURING PROJECTORS
SO-3 GROUPS
Gauge Invariance
't Hooft—Polyakov monopole near the Prasad—Sommerfield limit, 8: 44959 (J:US)
SODIUM
Electron Emission
Electron emission from metal-film systems under atomic particle bombardment, 8: 44871 (RA:SU:In Russian)
Equations of State
High-pressure equation of state of Li, Na, and K, 8: 44199 (R:US)
Melting
Melting of pseudopotential sodium from molecular dynamics, 8: 44311 (J:US)
Membrane Transport
Transplacental differences in Ca, Na, K, and electropotential in the guinea pig, 8: 44786 (R:US)
Phase Transformations
Melting of pseudopotential sodium from molecular dynamics, 8: 44311 (J:US)
SODIUM 23 BEAMS
Range
Range distributions of low-energetic light ions in silicon, 8: 45040 (R:DE:In German)
SODIUM CHLORIDES
Aerosol Generators
Aerosol generator for monodisperse Ag- and NaCl-aerosols in the particle size range between 2 nm and 300 nm, 8: 44676 (RA:DE)
Catalytic Effects
Mechanism of catalytic gasification of coal char. Final report, tasks 1-5, 8: 43170 (R:US)
Chemical Bonds
Photoionization studies of Na_2Cl and Na_2O and reactions of metal clusters, 8: 44884 (J:US)
Erosion
Investigation of the initial stages of surface erosion of solids under ion bombardment by the vacuum decoration method (20 keV Ar ions), 8: 44267 (RA:SU:In Russian)
Photoionization
Photoionization studies of Na_2Cl and Na_2O and reactions of metal clusters, 8: 44884 (J:US)
Physical Radiation Effects
Investigation of the initial stages of surface erosion of solids under ion bombardment by the vacuum decoration method (20 keV Ar ions), 8: 44267 (RA:SU:In Russian)
Kinetics of aggregation and annealing of defects in heavily X-irradiated alkali chloride crystals studied by positron annihilation, 8: 44316 (BA:NL)
Vacancies
Concerning the trapping of positrons in ionic solids, 8: 44318 (BA:NL)
SODIUM CITRATES
See SODIUM COMPOUNDS
SODIUM COMPOUNDS
See also SODIUM CHLORIDES
SODIUM FLUORIDES
SODIUM IODIDES
SODIUM NITRATES
SODIUM OXIDES
Catalytic Effects
Kinetics of coal pyrolysis and gasification. Final technical report for the period October 1979-September 1982, 8: 43164 (R:US)
Crystal Lattices
Calculation of the SHG coefficients of $NaNO_2$ crystals by using CNDO/S method, 8: 44344 (TJ:US)

Electronic Structure
Calculation of the SHG coefficients of $NaNO_2$ crystals by using CNDO/S method, 8: 44344 (TJ:US)

SODIUM FLUORIDES
Ion Collisions
X-ray emission in heavy-ion collisions. Progress report, March 1, 1982-March 1, 1983, 8: 44838 (R:US)

SODIUM IODIDES
Sputtering
Velocity measurements of neutral sputtered particles by means of a Doppler shift laser spectrometer, 8: 44847 (RA:SU)

SODIUM LAURYL SULFATES
See SODIUM COMPOUNDS

SODIUM MINERALS
See MINERALS

SODIUM NITRATES
Phase Transformations
Detection of phase transitions in $NaNO_3$ crystals by positron annihilation, 8: 44320 (BA:NL)

SODIUM OXIDES
Chemical Bonds
Photoionization studies of Na_2Cl and Na_2O and reactions of metal clusters, 8: 44884 (J:US)
Photoionization
Photoionization studies of Na_2Cl and Na_2O and reactions of metal clusters, 8: 44884 (J:US)

SODIUM-SULFUR BATTERIES
Research Programs
Ford/ERDA sodium-sulfur battery development. Phase II. Progress report No. 24, September 1-30, 1977, 8: 43978 (R:US)
Status of the Ford sodium-sulfur battery program, 8: 43977 (RA:US)

SOFT SOLDERING
See SOLDERING

SOIL CHEMISTRY
Relations between soil chemistry and moisture movement, 8: 44711 (R:US)

SOILS
Decontamination
Cleanup trial in the plutonium valley, 8: 44722 (J:US)
Heat Transfer
Analysis of the annual temperature wave propagating through an alluvial soil, 8: 44720 (R:US)
Radionuclide Migration
Characterization of radionuclide behavior in low level waste sites, 8: 43396 (J:US)
Removal
Cleanup trial in the plutonium valley, 8: 44722 (J:US)

SOLAR AIR HEATERS
Phase Change Materials
Application of phase change materials in passive solar systems, 8: 43625 (RA:US)
Testing
Development, testing and application of simple solar air heaters for agriculture and industry, 8: 43546 (R:DE:In German)

SOLAR CELLS
See also CADMIUM SULFIDE SOLAR CELLS
CADMIUM TELLURIDE SOLAR CELLS
GALLIUM ARSENIDE SOLAR CELLS
SILICON SOLAR CELLS
Encapsulation
Design, analysis, and test verification of advanced encapsulation systems. Triannual report for period ending 31 March 1983, 8: 43494 (R:US)
Performance Testing
Electrical performance subgroup standards development. Final report, 8: 43505 (R:US)
Research Programs
Photovoltaic status assessment: utility perspective , 8: 43499 (RA:US)
Testing
Photovoltaic status assessment: utility perspective , 8: 43499 (RA:US)

SOLAR COLLECTORS
See also SOLAR AIR HEATERS
Performance Testing
Thermal performance of solar collectors. Three years of outdoor exposure of eleven different products, 8: 43647 (R:SE:In Swedish)

SOLAR CONTROL FILMS
Holography
Holographic window coatings for solar control and daylighting: assessment report, 8: 44082 (R:US)

SOLAR COOLING SYSTEMS
See also PASSIVE SOLAR COOLING SYSTEMS
Demonstration Programs
Active solar heating-and-cooling system-development projects, 8: 43638 (R:US)
Program Management
Active solar heating and cooling program analysis and reporting. Final technical report, 13 November 1980-31 January 1982, 8: 44050 (R:US)
New directions in the US solar heating and cooling program, 8: 43482 (RA:US)
Research Programs
Active solar heating-and-cooling system-development projects, 8: 43638 (R:US)

SOLAR DOMESTIC WATER HEATING
See SOLAR WATER HEATING

SOLAR ENERGY
Cost Estimation
Solar energy quick reference guide, 8: 43481 (R:US)
Demonstration Plants
Briefing package: Solar energy for hot water preparation and space heating. Pt. 2, 8: 43643 (R:DE:In German)
Demonstration Programs
End-use research status report, April 1, 1983-June 30, 1983, 8: 43644 (R:US)
Energy Source Development
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Manuals
Solar energy quick reference guide, 8: 43481 (R:US)
Performance
Solar energy quick reference guide, 8: 43481 (R:US)
Research Programs
Julich Nuclear Researh Institute annual report, 1980/81, 8: 43835 (R:DE:GE)
National Research Program Solar Energy. Progress report for the period ending 30 June 1979, 8: 43478 (R:NL:In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1980, 8: 43544 (R:NL:In Dutch)
Status report on the Dutch National Research Program on Solar Energy per 31 December 1981, 8: 43545 (R:NL:In Dutch)
The National Research Program Solar Energy. Project overview first phase (1978-1981), 8: 43477 (R:NL:In Dutch)

SOLAR ENERGY CONVERSION
Solar energy for hot water preparation and space heating. Pt. 1, 8: 43642 (R:DE:In German)
Photochemical Reactions
Solar energy conversion in homogeneous solution. Progress report, 1 December 1982-30 November 1983, 8: 44356 (R:US)

SOLAR ENERGY RESEARCH INSTITUTE
Research Programs
Alcohol fuels activities at the Solar Energy Research Institute, 1982 (Program Summary), 8: 44052 (R:US)
Review of research on polycrystalline-silicon solar cells, 8: 43508 (R:US)

SOLAR HEATING SYSTEMS
See also PASSIVE SOLAR HEATING SYSTEMS
SOLAR-ASSISTED HEAT PUMPS
Solar energy for hot water preparation and space heating. Pt. 1, 8: 43642 (R:DE:In German)
Demonstration Programs
Active solar heating-and-cooling system-development projects, 8: 43638 (R:US)
Planning
Philadelphia Solar Planning Project, 8: 43489 (RA:US)

Program Management
Active solar heating and cooling program analysis and reporting. Final technical report, 13 November 1980-31 January 1982, 8: 44050 (R:US)
New directions in the US solar heating and cooling program, 8: 43482 (RA:US)
Research Programs
Active solar heating-and-cooling system-development projects, 8: 43638 (R:US)
SOLAR INDUSTRY
Passive solar industry, 8: 43483 (RA:US)
Air Pollution
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Institutional Factors
Photovoltaic status assessment: industry perspective, 8: 43532 (RA:US)
Interest Groups
Passive Solar Industries Council, 8: 43486 (RA:US)
Manpower
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Material Balance
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
Net Energy
Environmental implications of solar and biomass energy growth, 8: 44049 (R:US)
SOLAR ONE POWER PLANT
See BARSTOW SOLAR PILOT PLANT
SOLAR POWER PLANTS
See also OCEAN THERMAL POWER PLANTS
PHOTOVOLTAIC POWER PLANTS
SALINITY GRADIENT POWER PLANTS
SOLAR THERMAL POWER PLANTS
Contribution of wind energy to the energy balance of a combined solar-wind power station, 8: 43686 (RA:DE:In German)
SOLAR SEA POWER PLANTS
See OCEAN THERMAL POWER PLANTS
SOLAR THERMAL POWER PLANTS
See also DISTRIBUTED COLLECTOR POWER PLANTS
TOWER FOCUS POWER PLANTS
Latent Heat Storage
New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report, 8: 43651 (R:US)
Meetings
EPRI conference proceedings: solar and wind power - 1982 status and outlook, 8: 43536 (R:US)
Sensible Heat Storage
New thermal-energy-storage concepts for solar-thermal applications. Final subcontract report, 8: 43651 (R:US)
SOLAR WATER HEATING
Use for solar domestic water heating; not for process hot water.
Demonstration Programs
Mennonite Nursing Home passive solar demonstration project, 8: 43602 (RA:US)
SOLAR-ASSISTED HEAT PUMPS
Performance Testing
Brookhaven solar-heat-pump simulator: technical description and experimental results, 8: 43547 (R:US)
Simulators
Brookhaven solar-heat-pump simulator: technical description and experimental results, 8: 43547 (R:US)
SOLDERING
Specifications
Vapor-phase soldering techniques. Final report, 8: 44371 (R:US)
SOLID FUELS
See also BRIQUETS
Government Policies
Future energy landscape. Geographic image of the energy bill of 1981, 8: 44029 (R:SE:In Swedish)
Swelling
Energy supply and the swelling in solid fuels, 8: 43865 (R:BR:In Portuguese)
SOLID STATE LASERS
See also NEODYMIUM LASERS
Design
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Power
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Pumping
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Reviews
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Tuning
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
Uses
Future development of high-power solid-state laser systems, 8: 44408 (J:US)
SOLID WASTES
See also WOOD WASTES
Environmental Effects
Environmental effects of coal gasification, 8: 43263 (RA:US)
Solid waste management, 8: 43219 (RA:US)
Pollution Control
Impact of process design on effluent control technology needs in coal gasification, 8: 43235 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Waste Management
Solid waste management, 8: 43219 (RA:US)
Water Treatment
Method for treating solid substances in original water, 8: 44746 (TG:US)
SOLIDS
Charged-Particle Transport
Detailed analysis of the scope of the modified Firsov model, 8: 45051 (J:US)
Ion Implantation
Relation between the conditions of helium ion implantation and helium void equilibrium parameters, 8: 44279 (RA:SU:In Russian)
Physical Radiation Effects
Radiation damage physics and radiation technology, 8: 44280 (R:UA:RU)
Relation between the conditions of helium ion implantation and helium void equilibrium parameters, 8: 44279 (RA:SU:In Russian)
Role of inelastic processes in displaced atom production under irradiation of materials by neutrons and charged particles, 8: 44273 (RA:SU:In Russian)
Radiationless Decay
Vibronically coupled two-level systems: Radiationless transitions in the slow regime, 8: 45068 (J:US)
Sputtering
Periodical dependence of physical parameters defining the yield of sputtered ions, 8: 44868 (RA:SU)
SOLVENT-REFINED COAL PROCESS
See SRC PROCESS
SOLVENT-REFINING COAL PLANTS
See COAL PREPARATION PLANTS
SRC PROCESS
SOOT
Particle Size
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)
SOUTH AFRICA
Coal Gasification Plants
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
Methanol Plants
Environmental effects of a coal-based ammonia/methanol plant at Modderfontein, South Africa, 8: 43228 (RA:US)
SPACE HEATING
Wind Power Plants
Development and testing of heat generating wind power plants for heating of buildings, 8: 43687 (RA:DE:In German)

SPACE LATTICES
See CRYSTAL LATTICES
SPACE POWER REACTORS
Coated Fuel Particles
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Reactor Cores
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Thermodynamic Cycles
FBR and RBR particle bed space reactors, 8: 43818 (R:US)
SPACECRAFT POWER SUPPLIES
Impact Tests
Space nuclear-safety program. Progress report, January 1983, 8: 43417 (R:US)
Safety
Space nuclear-safety program. Progress report, January 1983, 8: 43417 (R:US)
SPECTRA
See also GAMMA SPECTRA
Data Processing
Operation with files in the mode of sequential access in the system of spectra processing, 8: 45299 (R:SU:In Russian)
SPECTRA UNFOLDING
Computer Codes
ACTIV-computer code for automatic processing of γ-ray spectra, 8: 45298 (R:SU:In Russian)
Data Processing
Storage and processing of one-dimensional spectra using the hierarchy computer system, 8: 45301 (R:SU:In Russian)
Numerical Solution
Method for unfolding high-energy scintillation gamma-ray spectra up to 8 MeV, 8: 45309 (R:DD:In German)
SPECTRALLY SELECTIVE SURFACES
Performance Testing
Study of the effectiveness of selective absorber coatings and phase change materials in passive solar space heating, 8: 43628 (RA:US)
SPECTROMETERS
See also GAMMA SPECTROMETERS
HEAVY ION SPECTROMETERS
MAGNETIC SPECTROMETERS
NEUTRON SPECTROMETERS
TIME-OF-FLIGHT SPECTROMETERS
X-RAY SPECTROMETERS
On-Line Measurement Systems
On-line electronic system for a multilayer semiconductor spectrometer, 8: 44588 (R:SU:In Russian)
SPECTROPHOTOMETERS
Optical Fibers
Optical fibers and their instrumentation applications, 8: 44630 (R:FR:In French)
SPENT FUEL ELEMENTS
Eddy Current Testing
Immersed multipurpose device for the inspection of PWR spent pencils in a loop reloaded in the Osiris pool, 8: 43883 (R:FR:In French)
Materials Testing
ISABELLE-4 loop: a PWR testing loop loaded and unloaded in the pool of the Osiris reactor, 8: 43884 (R:FR:In French)
SPENT FUEL STORAGE
Safety
Safety of storage facilities for LMFBR spent fuels, 8: 43342 (R:FR:In French)
SPENT FUELS
Degassing
Thermal release of volatile fission products from irradiated nuclear fuel, 8: 43375 (R:US)
Fission Product Release
Thermal release of volatile fission products from irradiated nuclear fuel, 8: 43375 (R:US)
Nondestructive Analysis
Assay of spent fuel by a simple reactivity method, 8: 43331 (J:US)
SPENT LIQUORS
Fermentation
Alcohol production from sugar mixtures by Pachysolen tannophilus, 8: 43464 (J:US)
SPENT SHALES
Leaching
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8: 43306 (R:US)
Mineralogy
Summary of raw- and spent-shale characterization studies from the Occidental Oil Shale, Inc., Logan Wash site and implications for water quality, 8: 43306 (R:US)
SPERM
See SPERMATOZOA
SPERMATIDS
See SPERMATOZOA
SPERMATOZOA
Cell Flow Systems
Cytometric analysis of mammalian sperm for induced morphologic and DNA content errors, 8: 44801 (R:US)
Morphology
Cytometric analysis of mammalian sperm for induced morphologic and DNA content errors, 8: 44801 (R:US)
SPHEROMAK DEVICES
Equilibrium
Experimental studies of spheromak formation, 8: 45184 (J:US)
Nonlinear saturation of nonresonant internal instabilities in a straight spheromak, 8: 45163 (J:US)
Plasma Instability
Nonlinear saturation of nonresonant internal instabilities in a straight spheromak, 8: 45163 (J:US)
Stability
Experimental studies of spheromak formation, 8: 45184 (J:US)
SPIN GLASS STATE
Statistical Mechanics
Free energy probability distribution in the SK spin glass model, 8: 45064 (RA:BR)
SPINELS
Grain boundary and lattice diffusion of ^{51}Cr in alumina and spinel, 8: 44262 (R:US)
Atom Transport
Grain boundary and surface diffusion in oxide systems. Technical progress report, 8: 44243 (R:US)
SPIN-OFF
See TECHNOLOGY TRANSFER
SQUID DEVICES
Superconducting Quantum Interference Devices
Noise
Flicker (1/f) noise in tunnel junction DC SQUIDS, 8: 44398 (J:US)
SRC PROCESS
Commercialization
SRC-I technology and its economics, 8: 43150 (RA:US)
Demonstration Plants
SRC-I technology and its economics, 8: 43150 (RA:US)
STACKING FAULTS
Channeling
Dechanneling by extended defects, 8: 44148 (RA:SU)
STADE REACTOR
Radioactive Effluents
Emission and ambient concentrations of longliving aerosol radionuclides at stade nuclear power plant, 8: 44705 (RA:DE)
STAINLESS STEEL-304
Crack Propagation
Crack growth behavior of sensitized stainless steel in high temperature, high purity oxygenated water, 8: 44175 (RA:US)
Low temperature sensitization of weld heat-affected zones in Type 304 stainless steel, 8: 44176 (RA:US)
Mechanism of environmentally-controlled crack-growth of structural steels in high-temperature water, 8: 44185 (RA:US)

Heat Affected Zone
Low temperature sensitization of weld heat-affected zones in Type 304 stainless steel, 8: 44176 (RA:US)
Intergranular Corrosion
Low temperature sensitization of weld heat-affected zones in Type 304 stainless steel, 8: 44176 (RA:US)
STAINLESS STEELS
See also STAINLESS STEEL-304
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Crack Propagation
Effects of PWR environment on the fatigue crack growth of different stainless steels and inconel type alloy, 8: 43783 (RA:US)
Ion Collisions
Influence of stopping power on the reflection coefficients of hydrogen ions from stainless steel, 8: 44861 (RA:SU)
Photon emission from ion bombarded solids, 8: 44862 (RA:SU)
Ion Implantation
Capture of H^+ and D_3^+ ions by stainless steel (15 keV ions of He and D_3), 8: 44153 (RA:SU:In Russian)
Physical Radiation Effects
Capture of H^+ and D_3^+ ions by stainless steel (15 keV ions of He and D_3), 8: 44153 (RA:SU:In Russian)
Influence of postirradiation annealing on the evolution of stainless steel surface structure bombarded with helium ions (Eph-838 austentic stainless steel; 175 keV helium ions), 8: 44154 (RA:SU:In Russian)
Some peculiarities of blister formation in metals under hydrogen ion bombardment, 8: 44155 (RA:SU:In Russian)
Which atomic processes dominate plasma wall interaction, 8: 44152 (RA:SU)
Surface Properties
Phenomenological study of heterogeneous chemical reactions of mercuric chloride on heated stainless steel surfaces, 8: 44336 (J:US)
STANDING CROP
See BIOMASS
STANFORD LINEAR ACCELERATOR CENTER
Accelerator Facilities
Stanford Linear Accelerator Center monthly report for September 1982, 8: 44520 (R:US)
Operation
Stanford Linear Accelerator Center monthly report for November 1982, 8: 44519 (R:US)
Stanford Linear Accelerator Center monthly report for May 1982, 8: 44518 (R:US)
Stanford Linear Accelerator Center monthly report for December 1982, 8: 44517 (R:US)
Stanford Linear Accelerator Center monthly report for June 1982, 8: 44516 (R:US)
Stanford Linear Accelerator Center monthly report for October 1982, 8: 44515 (R:US)
Personnel Dosimetry
Personnel neutron dosimetry at SLAC, 8: 45060 (R:US)
Research Programs
Stanford Linear Accelerator Center monthly report for November 1982, 8: 44519 (R:US)
Stanford Linear Accelerator Center monthly report for May 1982, 8: 44518 (R:US)
Stanford Linear Accelerator Center monthly report for December 1982, 8: 44517 (R:US)
Stanford Linear Accelerator Center monthly report for June 1982, 8: 44516 (R:US)
Stanford Linear Accelerator Center monthly report for October 1982, 8: 44515 (R:US)
Stanford Linear Accelerator Center monthly report for September 1982, 8: 44520 (R:US)
STANFORD LINEAR COLLIDER
Beam Dynamics
Verification of the SLC wake potentials, 8: 44506 (R:US)
Beam Monitoring
Single-bunch beams for BC-75, 8: 44479 (R:US)
Superconducting Magnets
Ideal of the perfect magnet-superconducting systems, 8: 44554 (R:US)
STAR BURNING
Astrophysical processes only.
Cross Sections
Charged particle reaction cross sections and nucleosynthesis, 8: 44827 (R:AU)
START-UP (REACTOR)
See REACTOR START-UP
STATE BUILDINGS
See PUBLIC BUILDINGS
STATE GOVERNMENT
Energy Conservation
Systematic review of approaches to assessing energy-conservation-program (SECP and EES) impacts, 8: 44026 (R:US)
STATISTICAL MECHANICS
Canonical Dimension
Ensemble corrections for the molecular-dynamics ensemble, 8: 45089 (J:US)
Quantum Mechanics
About one Newell's result and the quantum mechanical check of the microcanonical distribution, 8: 45081 (R:XJ)
STATISTICS
Limited to the indexing of information on the mathematical discipline of statistics or its application in other scientific disciplines; for indexing numerical values of a statistical nature use STATISTICAL DATA.
See also REGRESSION ANALYSIS
TRAN-STAT: statistics for environmental studies, No. 18, January 1982, 8: 45307 (R:US)
TRAN-STAT: statistics for environmental studies, 8: 45306 (R:US)
STEAM
Condensation Nuclei
Determination of condensation nuclei using a modified Aitken method, 8: 44668 (RA:DE:In German)
STEAM COOLANT
See STEAM
STEAM GENERATORS
Eddy Current Testing
In-service inspection of reactors (PWR), 8: 43763 (R:FR:In French)
Flow Regulators
Estimation of bias shifts in a steam-generator water-level controller, 8: 43869 (R:US)
Heat Transfer
Developing the algorithm and code for calculating an interchannel stability of steam generating channels, 8: 43854 (R:SU:In Russian)
Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor, 8: 43772 (R:BR:In Portuguese)
Program for computation of transition processes in the tube bundle of a steam generator module (DINAMO-2), 8: 43765 (R:SU:In Russian)
Hydraulics
Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor, 8: 43772 (R:BR:In Portuguese)
Program for computation of transition processes in the tube bundle of a steam generator module (DINAMO-2), 8: 43765 (R:SU:In Russian)
Intergranular Corrosion
Intergranular attack of Alloy 600: high-temperature electrochemical tests. Final report, 8: 44137 (R:FR)
Mathematical Models
Contribution to the dynamic behaviour of steam power plants, 8: 43733 (R:DE:In German)
Operation
Contribution to the dynamic behaviour of steam power plants, 8: 43733 (R:DE:In German)
Simulation
Numerical simulation of thermohydraulic behavior of the steam generator of PWR type reactor, 8: 43772 (R:BR:In Portuguese)

Tubes
Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982 (PWR), 8: 43785 (R:US)
Ultrasonic Testing
In-service inspection of reactors (PWR), 8: 43763 (R:FR:In French)
STEAM INJECTION
Bench-Scale Experiments
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
Optimization
Stability of steam-plus-nitrogen displacements of water in a porous medium. II. Final report, February 1981-December 1982, 8: 43277 (R:US)
STEAM TURBINES
Design
R & D for improved efficiency small steam turbines. Final technical report. Phases I and II, 8: 44464 (R:US)
Marketing Research
R & D for improved efficiency small steam turbines. Final technical report. Phases I and II, 8: 44464 (R:US)
STEEL INDUSTRY
See METAL INDUSTRY
STEEL-15KH2MFA
Crack Propagation
Subcritical crack growth in underclad region, 8: 44193 (RA:US)
STEEL-ASTM-A508
Crack Propagation
Crack growth resistance of low alloy steel in high temperature oxygenated water, 8: 43782 (RA:US)
Fracture Properties
Assessment of fracture toughness of heavy-section steels for nuclear pressure vessels, 8: 43861 (TJ:US)
STEEL-ASTM-A533
Crack Propagation
Crack growth resistance of low alloy steel in high temperature oxygenated water, 8: 43782 (RA:US)
STEEL-ASTM-A533-B
Corrosion Fatigue
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Crack Propagation
Corrosion fatigue mechanisms in ferritic pressure vessel steels exposed to simulated PWR environments, 8: 43860 (RA:US)
Oxide formation inside a cyclically loaded crack and its effect on environmental enhanced crack growth rate in 93°C water, 8: 44184 (RA:US)
Fracture Properties
Assessment of fracture toughness of heavy-section steels for nuclear pressure vessels, 8: 43861 (TJ:US)
STEELS
See also AUSTENITIC STEELS
CARBON STEELS
FERRITIC STEELS
STAINLESS STEELS
STEEL-ASTM-A508
STEEL-ASTM-A533
Corrosion Fatigue
Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8: 43784 (RA:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Crack Propagation
Fatiue crack growth through typical weld HAZ microstructures of SA 533 Gr. B steel in BWR water environment, 8: 43754 (RA:US)
Cyclic crack growth in high-temperature water-results of an international testing round robin, 8: 43858 (RA:US)
Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8: 43752 (RA:US)
Device for investigating subcritical crack growth of RPV steel specimens under BWR conditions, 8: 43755 (RA:US)
Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8: 43784 (RA:US)
Fatigue crack growth rates of irradiated pressure vessel steels in simulated nuclear coolant environment, 8: 43781 (RA:US)
Fatigue crack growth of low alloy steels in PWR environment, 8: 44182 (RA:US)
Influence of water chemistry on fatigue crack propagation in LWR pressure vessel steels, 8: 44181 (RA:US)
Investigation of fatigue crack growth in SA508-2 in a 288°C PWR environment by a constant ΔK test method, 8: 43780 (RA:US)
Mechanisms of environment assisted cyclic crack growth of nuclear reactor pressure vessel steels, 8: 44180 (RA:US)
Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels, 8: 43859 (RA:US)
Ductile-Brittle Transitions
Investigation on the dependence of RPV steel embrittlement on irradiation temperature and neutron exposure, 8: 44138 (R:DE)
Electroslag Casting
Electro-slag casting of steel, 8: 44239 (TJ:US)
Embrittlement
Investigation on the dependence of RPV steel embrittlement on irradiation temperature and neutron exposure, 8: 44138 (R:DE)
Fatigue
Fatiue crack growth through typical weld HAZ microstructures of SA 533 Gr. B steel in BWR water environment, 8: 43754 (RA:US)
Design-, operation-, and inspection-relevant factors of fatigue crack growth rates for pressure vessel and piping steels, 8: 43752 (RA:US)
Fatigue crack growth rates of irradiated pressure vessel steels in simulated nuclear coolant environment, 8: 43781 (RA:US)
Fatigue crack growth of low alloy steels in PWR environment, 8: 44182 (RA:US)
Fractography
Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8: 43784 (RA:US)
Fracture Properties
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Use of the strength ratio for pre-cracked Charpy specimens for the measuring, of the dynamic toughness of steels, 8: 44140 (R:BR:In Portuguese)
Impact Tests
Intermediate velocity penetration of steel spheres into deep aluminum targets, 8: 44195 (R:US)
Materials Testing
Cyclic crack growth in high-temperature water-results of an international testing round robin, 8: 43858 (RA:US)
Investigation of fatigue crack growth in SA508-2 in a 288°C PWR environment by a constant ΔK test method, 8: 43780 (RA:US)
Metallography
Electron micrographical investigations of a corrosion fatigue fracture surface developed under pressure water reactor conditions, 8: 43784 (RA:US)
Metallographical methods for observation of creep cavities in service exposed low alloyed steel, 8: 44198 (R:SE)
Physical Radiation Effects
Investigation on the dependence of RPV steel embrittlement on irradiation temperature and neutron exposure, 8: 44138 (R:DE)
Radiation hardening and creep of metals, 8: 44163 (RA:SU:In Russian)
Protective Coatings
Comparative experiments on the composition and structure of nickel-boron and nickel-phosphorus coatings, 8: 44238 (TJ:US)
STELLAR ATMOSPHERES
Excludes SOLAR ATMOSPHERE.
Oscillation Modes
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)

Pulsations
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
STELLAR BURNING
See STAR BURNING
STELLARATORS
See also TORSATRON STELLARATOR
Crossed Fields
Plasma equilibrium in a three-turn stellarator with correcting cross field, 8: 45252 (R:SU:In Russian)
STEREOCHEMISTRY
Symmetry Groups
Symmetry groups of chemical graphs, 8: 44355 (J:US)
STIMULATED EMISSION DEVICES
See LASERS
MASERS
STIRLING ENGINES
Design
Stirling engine design manual. Second edition, 8: 44123 (R:US)
Fuel Substitution
Biomass fueled Stirling engine combustor research, 8: 43473 (RA:US)
Manuals
Stirling engine design manual. Second edition, 8: 44123 (R:US)
Operation
Biomass fueled Stirling engine combustor research, 8: 43473 (RA:US)
STOCHASTIC PROCESSES
Phase Transformations
Phase transition in a four-dimensional random walk with application to medical statistics, 8: 45319 (J:US)
STORAGE RINGS
See also ISABELLE STORAGE RINGS
PEP STORAGE RINGS
Beam Dynamics
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part III. Beam-size enhancement due to the presence of nonlinear magnets in a ring, 8: 44507 (R:US)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part I. The Green's function for the Fokker-Planck equation, 8: 44560 (R:US)
Application of the Green's function method to some nonlinear problems of an electron storage ring. Part II. Checking the method by a quadrupole pertubation, 8: 44504 (R:US)
Coasting beam instabilities in storage rings, 8: 44557 (RA:DE)
Japanese facilities for HIF accelerator development, 8: 44559 (RA:DE)
Beam Extraction
Kickers and septa for the fast extraction of the beams of HIBALL, 8: 44524 (RA:DE)
Beam Injection
Multiturn injection for heavy ion fusion, 8: 44523 (RA:DE)
Computerized Control Systems
RSX system development under VAX/VMS compatibility mode, 8: 44552 (R:US)
Heavy Ions
Discussions of the storage ring group, 8: 44558 (RA:DE)
Ion Beams
Japanese facilities for HIF accelerator development, 8: 44559 (RA:DE)
Magnetic Fields
Closed orbit produced by an imperfect bump, 8: 44501 (R:US)
Orbits
Closed orbit produced by an imperfect bump, 8: 44501 (R:US)
STORAGE (SPENT FUEL)
See SPENT FUEL STORAGE
STORES
See COMMERCIAL BUILDINGS
STOVER
See AGRICULTURAL WASTES
STOVES
Ceramics
Russian fireplace: demonstrations and workshops. Final report, January 1, 1980-January 31, 1981, 8: 44084 (R:US)
Combustion Products
Chemical characterization of emmissions from wood-fired stoves, 8: 43510 (R:NO:In Norwegian)
Construction
Russian fireplace: demonstrations and workshops. Final report, January 1, 1980-January 31, 1981, 8: 44084 (R:US)
STREAMER SPARK CHAMBERS
Lasers
Laser streamer chambers with increased pressure, 8: 44601 (R:SU:In Russian)
On-Line Systems
Comparative characteristics of program simulators of SHP and HDR special processors for on-line data processing, 8: 44604 (R:SU:In Russian)
Particle Tracks
Helium streamer chamber with laser track registration at gas pressure up to 5 atm, 8: 44587 (R:SU:In Russian)
STREETS
See ROADS
STRING MODELS
Treating the interactions of extended particles through breaking and connection of strings.
Casimir Operators
Quasi-Abelian versus large-N/sub c/ linear confinement, 8: 44955 (J:US)
STRONTIUM
Catalytic Effects
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
STRONTIUM 90
Radioecological Concentration
Radioecological analysis of the Elbe river. Pt. 1. Pre-loading, concentration factors, 8: 44747 (R:DE:In German)
Worldwide deposition of ^{90}Sr through 1981, 8: 44716 (R:US)
STRONTIUM CHLORIDES
Formation Heat
Enthalpies of formation of strontium dichloride and of the strontium ion (Sr^{2+}) in water and in 1 $mol.dm^{-3}$ HCl, and an assessment of enthalpies of formation of alkaline-earth dichlorides, 8: 44338 (J:GB)
STRUCTURAL MATERIALS
See BUILDING MATERIALS
STRUCTURES (BUILDINGS)
See BUILDINGS
STRUCTURES (MECHANICS)
See MECHANICAL STRUCTURES
STYRENE
Chemical Radiation Effects
Preparation of permselective membranes by means of radiation induced grafting. Part of a coordinated programme on radiation modified polymers for biomedical and biochemical applications. Final report for the period 1 August 1980 - 31 August 1982, 8: 44360 (R:XA)
STYRENE POLYMERS
See POLYSTYRENE
SUBCRITICAL FLOW
See LAMINAR FLOW
SUBSIDENCE (GROUND)
See GROUND SUBSIDENCE
SUBURBS
See URBAN AREAS
SUCROSE
See SACCHAROSE
SUGAR
See SACCHAROSE
SUGAR BEETS
Fermentation
Fermentation studies on extracts of beet, 8: 43452 (R:NZ)
SULFATES
See also PLUTONIUM SULFATES

Aerosol Monitoring
Combination of a screen-diffusion-battery with a single-stage impactor for size selective aerosol sampling, 8: 44675 (RA:DE)
Corrosive Effects
AR & TD Fossil-Energy Materials Program. Quarterly progress report for the period ending March 31, 1983, 8: 43185 (R:US)
Removal
Sulfate aerosols from western low-rank coal-fired boilers with FGD: summary of tests at Coal Creek, Clay Boswell, Milton R. Young, and San Miguel stations. MRI-83-FR-1849, 8: 43213 (R:US)
Trajectories
Trajectory model with varying mixing height, 8: 44680 (R:DK:In Danish)

SULFITE WASTE LIQUOR
See SPENT LIQUORS

SULFUR
Production
Acid-gas bioconversion favors sulfur production, 8: 44781 (J:US)
Recovery
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
Removal
Application of environmental control technology on Lurgi dry ash and on British Gas/Lurgi slagging gasifiers, 8: 43231 (RA:US)
Fuel quality/processing study. Vol. III. Fuel-upgrading studies, 8: 43176 (R:US)

SULFUR 32 REACTIONS
Fusion Reactions
Prompt compound nuclear K X-rays in fusion reactions induced by a heavy projectile, 8: 45010 (J:NL)

SULFUR 32 TARGET
Neutron Reactions
Calculation of the energy-averaged scattering function from high resolution low-energy neutron scattering data, 8: 44990 (J:US)

SULFUR COMPOUNDS
See also CARBON OXYSULFIDE
SULFATES
SULFUR FLUORIDES
SULFUR OXIDES
Adsorption
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Environmental Transport
Sulphur and chloride deposition and ecosystem transport in a strongly acidified lake watershed, 8: 44735 (RA:DK)

SULFUR DIOXIDE
Atmospheric Chemistry
Chemical pathways from stack emissions to surface water, 8: 44663 (RA:DK)
Corrosive Effects
Effect on atmospheric corrosion costs of a requirement for oils with a low sulphur content, 8: 44173 (R:NO)
Ecological Concentration
Effect of future centralized heating in Oslo on air quality. Pt. 1, 8: 44708 (R:NO:In Norwegian)
Environmental Impacts
Biological effects of acidity in precipitation on vegetation: a review, 8: 44811 (J:GB)

SULFUR FLUORIDES
Electric Discharges
Role of photodetachment in initiation of electric discharges in SF_6 and O_2, 8: 45171 (J:US)

SULFUR HYDRIDES
See HYDROGEN SULFIDES

SULFUR IONS
Electron-Ion Collisions
Quantum-defect and distorted-wave theory applied to the resonance contribution of inelastic electron scattering, 8: 44898 (J:US)

SULFUR OXIDES
See also SULFUR DIOXIDE
Air Pollution Control
Fuel quality/processing study. Volume II. Literature survey, 8: 43175 (R:US)
Removal
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)
Trajectories
Trajectory model with varying mixing height, 8: 44680 (R:DK:In Danish)

SULFUR SULFIDES
See SULFUR

SULFURIC ACID
New approach to the determination of atmospheric strong acids, 8: 44670 (RA:DE)

SUPERCONDUCTING CABLES
Testing
Brookhaven superconducting power transmission system, 8: 44397 (J:US)

SUPERCONDUCTING CAVITY RESONATORS
Investigation of real niobium surfaces by rf-measurements between 12 and 18GHz, 8: 44389 (R:DE:In German)

SUPERCONDUCTING MAGNETS
Superconducting magnets, 8: 44376 (RA:DE)
Cooling
Refrigeration of pulsed superconducting magnets with coil parallel cooling by two-phase helium, 8: 44536 (R:SU:In Russian)
Deformation
Study on training and mechanical degradation in superconducting magnet models, 8: 44377 (R:SU:In Russian)
Design
Ideal of the perfect magnet-superconducting systems, 8: 44554 (R:US)
Tokamak poloidal-field systems. Progress report, January 1-December 31, 1982, 8: 45254 (R:US)
Dipoles
Analysis of factors effecting superconducting dipole field homogeneity, 8: 44493 (R:SU:In Russian)
Magnetic Fields
Analysis of factors effecting superconducting dipole field homogeneity, 8: 44493 (R:SU:In Russian)
Power Supplies
Alternative connections for the large MFTF-B solenoids, 8: 45260 (R:US)
Safety
Design and testing of a prototype water-cooled vacuum interrupter for use in superconducting-magnet protection circuits, 8: 45253 (R:US)
Shielding
Use of fusion-welding techniques in fabrication of a superconducting-magnet thermal-shield system, 8: 45262 (R:US)
Switches
Design and testing of a prototype water-cooled vacuum interrupter for use in superconducting-magnet protection circuits, 8: 45253 (R:US)

SUPERCONDUCTING QUANTUM INTERFERENCE DEVI
See SQUID DEVICES

SUPERCONDUCTIVITY
Bibliographies
Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands, 8: 44908 (R:NL)

SUPERCONDUCTORS
See also TYPE-I SUPERCONDUCTORS
TYPE-II SUPERCONDUCTORS
Fabrication
Conductor for a fluid-cooled winding, 8: 44396 (P:US)

SUPERCRITICAL FLOW
See TURBULENT FLOW

SUPERFLUIDITY
Bibliographies
Communications from the Kamerlingh Onnes Laboratory of the University of Leiden, The Netherlands, 8: 44908 (R:NL)

SUPERGRAVITY
Postulated Particles
Light scalars in N=1 locally supersymmetric theories, 8: 44957 (J:NL)
Research Programs
Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983 (Brandeis University), 8: 44911 (R:US)
SUPERSYMMETRY
Research Programs
Research in elementary-particle physics. Technical progress report, April 1, 1982 to June 1, 1983 (Brandeis University), 8: 44911 (R:US)
SUPERVOLTAGE RADIOTHERAPY
See RADIOTHERAPY
SUPPLY AND DEMAND
Mathematical Models
Analytical assumptions and causal ordering in interindustry modeling, 8: 43989 (R:US)
SUPPLY DISRUPTION
Economic Impact
Energy: everybody's business, 8: 44031 (RA:US)
SURFACE BARRIER DETECTORS
Application of the arsenide-gallium detectors in X-ray radiometric analysis, 8: 44613 (RA:SU:In Russian)
Fabrication
Surface-barrier detectors made of silicon doped by phosphorus in thermal neutron flux, 8: 44589 (R:SU:In Russian)
SURFACE MINING
Explosive Fracturing
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)
Land Reclamation
Reclaiming mined lands in arid environments, 8: 43252 (R:US)
Well Drilling
Drilling and blasting techniques and costs for strip mines in Appalachia, 8: 43250 (R:US)
SURFACE WATERS
See also LAKES
SEAS
Chemical Analysis
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
Chemical Composition
Role of soil in determining surface water composition, 8: 44725 (RA:DK)
Mathematical Models
Water system model development and applications within AEC and NASA laboratories, 8: 44724 (RA:US)
Sampling
Application of ultraclean sampling and analytical techniques to an investigation of the impact of power-plant derived heavy metals on groundwater, riverwater, bottom sediments and benthic organisms, 8: 44731 (RA:DK)
SUSPENSIONS (FUEL)
See FUEL SLURRIES
SWEDEN
BWR Type Reactors
Safety considerations for light-water-reactor nuclear power plants: a Swedish perspective, 8: 43947 (R:US)
Energy Policy
Future energy landscape. Geographic image of the energy bill of 1981, 8: 44029 (R:SE:In Swedish)
Geothermal Energy
Preparatory investigation for geothermal heat pump plant in the commune of Landskrona, 8: 43657 (R:SE:In Swedish)
Granites
Petrology and radiogeology of the Stripa pluton, 8: 44817 (R:US)
Water inflow into boreholes during the Stripa heater experiments, 8: 43362 (R:US)
Nuclear Power Plants
System reliability engineering in the Swedish nuclear regulatory process, 8: 43957 (BA:US)
SWIMMING POOL REACTORS
See POOL TYPE REACTORS
SWIMMING POOL TANK REACTOR AUSTRIA
See ASTRA REACTOR
SWITCHES
Design
Design and testing of a prototype water-cooled vacuum interrupter for use in superconducting-magnet protection circuits, 8: 45253 (R:US)
SWITCHING DIODES
Failures
Thermally induced switching and failure in p-i-n RF control diodes, 8: 44460 (J:US)
Thermal Degradation
Thermally induced switching and failure in p-i-n RF control diodes, 8: 44460 (J:US)
SWITZERLAND
Radioactive Waste Disposal
Data base for a site-specific analysis of the dispersion of radioactive elements from a final repository, 8: 43399 (TG:US)
Reactor Technology
Swiss Federal Institute for Reactor Research. 1981 annual report, 8: 43834 (R:CH:GE)
SYNCHROTRON RADIATION
Reviews
Research with X rays, 8: 45055 (J:CS:In Czech)
SYNTHESIS GAS
Chemical Composition
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Phase Studies
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Production
Development of biomass gasification to produce substitute fuels, 8: 43428 (RA:US)
Gasification of forest residues in a high-throughput gasifier, 8: 43427 (RA:US)
Quenching
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
SYNTHETIC FUELS
See also ALCOHOL FUELS
Forecasting
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Market
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Mutagen Screening
Health effects studies, 8: 43227 (RA:US)
Prices
Ninth annual international conference on coal gasification, liquefaction and conversion to electricity. Proceedings, 8: 43148 (R:US)
Production
Fuels of the future, 8: 43424 (RA:DE:In German)
SYNTHETIC FUELS CORPORATION
Planning
US Synthetic Fuels Corporation overview, 8: 43149 (RA:US)
SYNTHETIC FUELS INDUSTRY
Economic Analysis
Challenges that remain: can synfuel technology make it on the outside, 8: 43160 (RA:US)
Economic Impact
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
Feasibility Studies
Challenges that remain: can synfuel technology make it on the outside, 8: 43160 (RA:US)

Forecasting
Challenges that remain: can synfuel technology make it on the outside, 8: 43160 (RA:US)
Pollution Control
Environmental regulation of the synfuel industry, 8: 43268 (RA:US)
Pollution Regulations
Environmental regulation of the synfuel industry, 8: 43268 (RA:US)
Risk Assessment
SRC-I technology and its economics, 8: 43150 (RA:US)

SYNTHETIC FUELS REFINERIES
Training
Energy plant process operations Curriculum-Development Project. Final technical report, 8: 43283 (R:US)

SYNTHINE PROCESS
See FISCHER-TROPSCH SYNTHESIS

SYSTEM FAILURE ANALYSIS
Initial guidance on digraph-matrix analysis for systems interaction studies (PWR; BWR), 8: 43939 (R:US)
Mathematical Models
Denpendency models and probability of joint events, 8: 44444 (R:NO)
Suggestions concerning the use of failure data, 8: 44445 (R:NO)

T

TANDEM ELECTROSTATIC ACCELERATORS
Prior to February 1979,information was indexed to Van de Graaff Accelerators.
Heavy Ion Accelerators
Possible use of synchrotrons as post-acceleration boosters for tandems, 8: 44509 (R:US)

TANDEM MIRROR DEVICES
See TMX DEVICES

TANTALUM
Ion Implantation
Vacancy annealing stage in heavy ion implanted bcc metals (70 keV Xe ions), 8: 44149 (RA:SU)
Physical Radiation Effects
Which atomic processes dominate plasma wall interaction, 8: 44152 (RA:SU)

TANTALUM ALLOYS
Electric Conductivity
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_3 alloy, 8: 44213 (J:US)
Magnetic Susceptibility
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_3 alloy, 8: 44213 (J:US)
Specific Heat
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_3 alloy, 8: 44213 (J:US)

TANTALUM OXIDES
Sputtering
Sputtering and stoichiometric changes by bombardment of Ta_2O_5 with keV light ions, 8: 44873 (RA:SU)

TANTALUM SELENIDES
Phase Transformations
Search for the charge density wave in solids by positrons: a 2H-$TaSe_2$ crystal, 8: 44321 (BA:NL)

TAR
See also BITUMENS
Recycling
Utilization of waste streams in biomass gasifiers, 8: 43431 (RA:US)
Waste Processing
Utilization of waste streams in biomass gasifiers, 8: 43431 (RA:US)

TAR SAND OIL
See BITUMENS

TARGET CHAMBERS
Cryogenics
Autonomous cryogenic targets for neutron-physical experiments, 8: 44535 (RA:SU:In Russian)
Physical Radiation Effects
Neutron fuel interaction in a HIBALL target, 8: 45042 (RA:DE)
Tritium
Liquid-tritium target for mesoatomic and mesomolecular experiments, 8: 44544 (R:SU:In Russian)

TARGETS
See also ALUMINIUM 27 TARGET
BERYLLIUM 9 TARGET
BISMUTH 209 TARGET
BORON 11 TARGET
CALCIUM 40 TARGET
CALCIUM 42 TARGET
CALCIUM 48 TARGET
CARBON 12 TARGET
CARBON 14 TARGET
DEUTERIUM TARGET
ELECTRON BEAM TARGETS
GOLD 197 TARGET
HELIUM 3 TARGET
HELIUM 4 TARGET
IODINE 127 TARGET
IRON 56 TARGET
LASER TARGETS
LEAD 206 TARGET
LEAD 208 TARGET
LEAD 209 TARGET
LITHIUM 7 TARGET
MAGNESIUM 24 TARGET
MAGNESIUM 26 TARGET
NICKEL 58 TARGET
NITROGEN 14 TARGET
NITROGEN 15 TARGET
OXYGEN 16 TARGET
OXYGEN 18 TARGET
PLATINUM 196 TARGET
PLATINUM 198 TARGET
PLUTONIUM 239 TARGET
POTASSIUM 39 TARGET
POTASSIUM 41 TARGET
SAMARIUM 152 TARGET
SILICON 28 TARGET
SILICON 29 TARGET
SILICON 30 TARGET
SULFUR 32 TARGET
TIN 116 TARGET
TIN 120 TARGET
TIN 124 TARGET
TRITIUM TARGET
ZIRCONIUM 90 TARGET
ZIRCONIUM 92 TARGET
Heating
Temperature distribution in targets irradiated by heavy ions, 8: 44546 (R:SU:In Russian)
Physical Radiation Effects
Temperature distribution in targets irradiated by heavy ions, 8: 44546 (R:SU:In Russian)

TECHNETIUM 99
Diagnostic Uses
Right and left ventricular ejection fraction at rest and during exercise assessed with radionuclide angiocardiography, 8: 44772 (R:SE:In Swedish)
Isomers
Application of technetium-99m-phosphate isomers in nuclear medicine. A comparative study, 8: 44779 (B:ZA:In Afrikaans)

TECHNOLOGY ASSESSMENT
Economic Analysis
Evaluating new US energy technologies, 8: 44015 (J:US)

TECHNOLOGY TRANSFER
Control
Technology transfer to the East: an annotated bibliography for 1976 to 1981, 8: 43981 (R:US)

TECHNOLOGY UTILIZATION
Socio-Economic Factors
Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves, 8: 44014 (J:GB)

TEL
Hydroxyl Radicals
Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air, 8: 44688 (R:DK)

Lifetime
Direct spectrokinetic investigation of the reactivity of OH with tetraalkyllead compounds in gas phase. Estimate of lifetimes of tetraalkyllead compounds in ambient air, 8: 44688 (R:DK)

TELESCOPE COUNTERS
Cooling
Using heat pipes for cooling detectors and preamplifiers inside the vacuum chamber of the accelerator in a spectrometer of recoil nuclei, 8: 44586 (R:SU:In Russian)
Heat Pipes
Using heat pipes for cooling detectors and preamplifiers inside the vacuum chamber of the accelerator in a spectrometer of recoil nuclei, 8: 44586 (R:SU:In Russian)

TELLURIUM 133
Beta-Minus Decay
Population of ^{133}I from the beta decay of fission product ^{133}Te/sup g/ and the cluster-vibration model, 8: 45003 (J:US)

TEMPERATURE (0400-1000 K)
See HIGH TEMPERATURE

TEMPERATURE (AMBIENT)
See AMBIENT TEMPERATURE

TEMPERATURE GRADIENTS
Wave Propagation
Analysis of the annual temperature wave propagating through an alluvial soil, 8: 44720 (R:US)

TEMPERATURE MONITORING
Optical Fibers
Measurement of peak temperature along an optical fiber, 8: 44650 (J:US)

TENNESSEE
Coal Gasification Plants
Memphis industrial fuel gas demonstration plant, 8: 43181 (RA:US)

TENNESSEE VALLEY AUTHORITY
Fertilizers
Fertilizer trends 1982, 8: 44009 (R:US)

TERBIUM
Coprecipitation
Selective laser excitation of terbium(III) in lanthanum(III) fluoride precipitates, 8: 44330 (J:US)
Fluorescence Spectroscopy
Selective laser excitation of terbium(III) in lanthanum(III) fluoride precipitates, 8: 44330 (J:US)

TERBIUM ISOTOPES
Beta-Minus Decay
Identification of a new isotope ^{165}Tb, 8: 45014 (J:US)
Isotope Production
Identification of a new isotope ^{165}Tb, 8: 45014 (J:US)

TERTIARY RECOVERY
See ENHANCED RECOVERY

TEST FACILITIES
Modifications
Experimental evaluation of the steady state and dynamic performance characteristics of the interactive units of a coal gasification process. Quarterly report for the period 30 March 1981-28 June 1981, 8: 43165 (R:US)
Operation
Experimental evaluation of the steady-state and dynamic performance characteristics of the interactive units of a coal-gasification process. Quarterly report, 29 June 1981-27 September 1981, 8: 43166 (R:US)

TESTES
Neoplasms
Effectiveness of testis cancer screening, 8: 44760 (R:DE:In German)

TESTING (MATERIALS)
See MATERIALS TESTING

TETRACHLOROMETHANE
See CARBON TETRACHLORIDE

TETRAETHYL LEAD
See TEL

TEXACO GASIFICATION PROCESS
Commercialization
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Demonstration Plants
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Fuel Feeding Systems
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Health Hazards
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Pilot Plants
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Slags
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)

TEXAS
Magnetic Surveys
Airborne gamma-ray spectrometer and magnetometer survey, Dryden, Texas; Indian Wells, Texas. Volume I. Detail area. Final report, 8: 43312 (R:US)
Mineral Resources
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)
Radiometric Surveys
Airborne gamma-ray spectrometer and magnetometer survey, Dryden, Texas; Indian Wells, Texas. Volume I. Detail area. Final report, 8: 43312 (R:US)
Salt Deposits
Evaluation of potential mineral resources in the vicinity of seven selected domes in Texas, Louisiana, and Mississippi, 8: 44008 (R:US)
Exploratory shaft conceptual design report: Permian Basin, 8: 43370 (R:US)

TEXT EDITORS
Additional symbols used in double-spaced text for Wang OIS word-processor users, 8: 45316 (R:US)

TEXTILE INDUSTRY
Energy Conservation
Economic and energy audit of textile foam processing, 8: 44103 (R:US)
Wood Fuels
Case study of a commercial small-scale wood-fueled steam boiler for textile mill operations, 8: 43474 (BA:US)

TEXTILES
Drying
IV 5: all-electric drying of textile cloths, 8: 44106 (TG:GB)
Processing
Economic and energy audit of textile foam processing, 8: 44103 (R:US)

TFTR REACTORS
Cryopumps
Cryopump operations with the tokamak neutral beam injector prototype, 8: 45274 (BA:US)
Refrigerating Machinery
Cryogenics for neutral beam testing, 8: 45275 (BA:US)

THERMAL ANALYSIS
Simulation of thermal transients using CSMP, 8: 44416 (R:BR:In Portuguese)

THERMAL BATTERIES
Cathodes
Additive for iron disulfide cathodes used in thermal batteries, 8: 43980 (P:US)
Thermometers
Accelerated aging of Wahl Temp-Plate temperature-recording devices, 8: 44642 (R:US)

THERMAL DECOMPOSITION
See PYROLYSIS

THERMAL EFFICIENCY
Pressure Dependence
RUHR 100: new results on the advanced development of the pressurized Lurgi-gasification, 8: 43152 (RA:US)

THERMAL EFFLUENTS
Monitoring
Biological monitoring of thermal effects of cooling water discharges from Danish power plants, 8: 44804 (RA:DK)
THERMAL ENERGY STORAGE EQUIPMENT
Sensible Heat Storage
Large-scale thermal storage systems, 8: 43971 (R:DE:In German)
Technology Assessment
Large-scale thermal storage systems, 8: 43971 (R:DE:In German)
THERMAL GRADIENTS
See TEMPERATURE GRADIENTS
THERMAL INSULATION
Design
VIS product development, 8: 43622 (RA:US)
Field Tests
VIS product development, 8: 43622 (RA:US)
Honeycomb Structures
Honeycomb thermal shade development, 8: 43627 (RA:US)
Marketing Research
VIS product development, 8: 43622 (RA:US)
Radiant Heat Transfer
Radiative heat transfer in fibrous insulations: Part 1: Analytical study, 8: 44437 (J:US)
Radiative heat transfer in fibrous insulations: Part II: Experimental study, 8: 44438 (J:US)
THERMAL NEUTRONS
Scattering
Calculation of the Kernel scattering for thermal neutrons in H_2O and D_2O, 8: 43795 (RA:BR:In Portuguese)
THERMAL POLLUTION
Flow Rate
Measurement of jet propagation in the intermediate near-field of a coolant water outlet, 8: 44751 (R:DE:In German)
THERMAL POLLUTION (AIR)
See AIR POLLUTION
THERMAL POLLUTION
THERMAL POLLUTION (WATER)
See THERMAL POLLUTION
WATER POLLUTION
THERMAL POWER PLANTS
See also COMBINED-CYCLE POWER PLANTS
FOSSIL-FUEL POWER PLANTS
GEOTHERMAL POWER PLANTS
NUCLEAR POWER PLANTS
OCEAN THERMAL POWER PLANTS
REFUSE-FUELED POWER PLANTS
SOLAR THERMAL POWER PLANTS
Cooling Towers
Impacts of evaporative cooling towers in arid environments, 8: 43737 (J:GB)
THERMAL REACTORS
See also ANGRA-1 REACTOR
ANGRA-2 REACTOR
ANGRA-3 REACTOR
ASTRA REACTOR
ATR REACTOR
BER-2 REACTOR
BIG ROCK POINT REACTOR
BUGEY-1 REACTOR
CANDU TYPE REACTORS
CONNECTICUT YANKEE REACTOR
DRESDEN-1 REACTOR
DRESDEN-2 REACTOR
GINNA-1 REACTOR
HBWR REACTOR
IEAR-1 REACTOR
LACBWR REACTOR
OSIRIS REACTOR
OYSTER CREEK-1 REACTOR
PALISADES-1 REACTOR
ROWE YANKEE REACTOR
SAN ONOFRE-1 REACTOR
SEABROOK-2 REACTOR
SHIPPINGPORT REACTOR
STADE REACTOR
THREE MILE ISLAND-2 REACTOR
VK-50 REACTOR
WWER TYPE REACTORS
Heterogeneous Reactor Cores
Method for calculating the lifetime of a heterogeneous reactor with regular lattice of reactor control system elements, 8: 43850 (R:SU:In Russian)
Post-Irradiation Examination
Validation of KEDAK-4 data for thermal reactors: Resonance integrals and postirradiation fuel analysis, 8: 43849 (R:DE)
Reactor Kinetics
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8: 43842 (R:XA)
THERMAL STORAGE
See HEAT STORAGE
THERMAL STRESSES
Simulation
Photothermoelastic simulation of transient thermal stresses, 8: 44418 (R:BR)
THERMOCHEMICAL PROCESSES
See also COMBUSTION
GASIFICATION
PYROLYSIS
Economic Analysis
Technical and economic assessment of emerging advanced biomass thermochemical conversion techniques, 8: 43432 (RA:US)
Technology Assessment
Technical and economic assessment of emerging advanced biomass thermochemical conversion techniques, 8: 43432 (RA:US)
THERMOCOUPLES
Data Covariances
Error analysis of thermocouple measurements in the Climatic Facility, 8: 44643 (R:US)
THERMOLUMINESCENT DOSEMETERS
Background Radiation
Fading and buildup in TLD-100 cards used for personal dosimetry, 8: 44621 (R:IL:In Hebrew)
THERMOLUMINESCENT DOSIMETRY
Data Analysis
General approach to assure compliance with ALARA guidelines on direct radiation from a nuclear power plant, January 1979-January 1982, 8: 43936 (R:US)
THERMOMETERS
Performance Testing
Accelerated aging of Wahl Temp-Plate temperature-recording devices, 8: 44642 (R:US)
THERMONUCLEAR DEVICES
Meetings
11th Czechoslovak seminar on plasma physics and technology, 8: 45249 (R:CS)
THERMONUCLEAR FUELS
Fuel Injection Systems
Model for pneumatic pellet injection, 8: 45257 (R:US)
THERMONUCLEAR POWER PLANTS
Diagnostic Techniques
Bayesian parallel processing method for power plant diagnostics, 8: 45277 (J:US)
THERMONUCLEAR REACTIONS
See also IMPACT FUSION
Catalysts
Experimental investigation of muon-catalyzed fusion in high-density deuterium-tritium mixtures, 8: 45215 (R:US)
Inertial Confinement
Final beam transport in the reactor chamber, 8: 45239 (RA:JP)
Research Programs
Overview of the use of Monte Carlo methods in controlled thermonuclear fusion research, 8: 45194 (J:US)
THERMONUCLEAR REACTOR MATERIALS
Blisters
Radiation damage studies in fusion reactor materials. Part of a coordinated programme on energetic particle interactions with materials of importance for fusion reactors. Final report for the period 1 February 1977 - 15 December 1980, 8: 45225 (R:XA)
Cracks
Dynamic breaking phenomena of structures under electromagnetic field, 8: 45267 (RA:JP:In Japanese)
Destructive Testing
Dynamic breaking phenomena of structures under electromagnetic field, 8: 45267 (RA:JP:In Japanese)

Physical Radiation Effects
Study of radiation damage in nuclear- and thermonuclear materials using accelerators, 8: 44162 (RA:SU:In Russian)
Surface effects in fusion device operation, 8: 44151 (RA:SU)
Which atomic processes dominate plasma wall interaction, 8: 44152 (RA:SU)

THERMONUCLEAR REACTORS
For use in cases where certain aspects of either hypothetical or real thermonuclear reactors are discussed.
See also LASER FUSION REACTORS
MAGNETIC MIRROR TYPE REACTORS
TOKAMAK TYPE REACTORS
Breeding Blankets
Neutron multiplier alternative for fusion reactor blankets, 8: 45240 (R:PL)
Charged-Particle Transport
Vectorized Monte Carlo for nonlinear radiation transport, 8: 45283 (J:US)
Convection
Solution of convection-dominated flows, 8: 45279 (J:US)
Heat Transfer
Report of study meeting on heat transfer and structure problems in nuclear facilities, 1979, 8: 45269 (R:JP:JA)
Incompressible Flow
A nodal integral method for the numerical solution of incompressible fluid flow problems, 8: 45280 (J:US)
Inertial Confinement
Heavy ion ICF study from the view of energy costs, 8: 45217 (RA:DE)
HIBALL - a conceptual design study of a heavy-ion driven inertial confinement fusion power plant, 8: 45216 (RA:DE)
Information Needs
Determine atomic data pertinent to the magnetic-fusion-energy program for one-half of FY 1984, 8: 45103 (R:US)
Radioactive Waste Management
Issues in radioactive waste management for fusion power, 8: 43416 (J:US)
Reactor Lattices
Vectorized Monte Carlo for nonlinear radiation transport, 8: 45283 (J:US)
Reactor Safety
Improved iterative method for solution of fully implicit thermal-hydraulics equations, 8: 45278 (J:US)
Research Programs
Overview of the use of Monte Carlo methods in controlled thermonuclear fusion research, 8: 45194 (J:US)
Thermal Stresses
Report of study meeting on heat transfer and structure problems in nuclear facilities, 1979, 8: 45269 (R:JP:JA)

THETA PINCH
Plasma Instability
Suppression of the n = 2 rotational instability in field-reversed configurations, 8: 45185 (J:US)

THIN FILMS
Electrical Properties
Electrical and optical properties of amorphous thin films, 8: 43527 (BA:US)
Optical Properties
Electrical and optical properties of amorphous thin films, 8: 43527 (BA:US)

THIO COMPOUNDS
See ORGANIC SULFUR COMPOUNDS

THORIUM
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Ion Exchange Chromatography
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B.DE:In German)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Radioecological Concentration
Background radioactivity from natural occurrences: a preliminary review, 8: 44717 (R:US)

THORIUM ALLOYS
Critical Temperature
Two critical points on the γ-α phase boundary of cerium alloys, 8: 44221 (J:US)
Phase Diagrams
Two critical points on the γ-α phase boundary of cerium alloys, 8: 44221 (J:US)

THORIUM CARBIDES
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)

THORIUM CYCLE
Possible types of breeders with thorium cycle, 8: 43805 (RA:BR:In Portuguese)
Research Programs
KFA/NUCLEBRAS R + D program on Th utilization in PWR, 8: 43831 (R:BR)

THORIUM D
See LEAD 208

THORIUM OXIDES
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)

THREE MILE ISLAND-2 REACTOR
Activity Levels
Reactor-building-basement radionuclide and source distribution studies. Volume 3, 8: 43910 (R:US)
Containment Buildings
Reactor-building-basement radionuclide and source distribution studies. Volume 3, 8: 43910 (R:US)
Decontamination
Comparison of occupational dose estimates for TMI-2 recovery operation, 8: 43787 (R:US)
Radiation Hazards
Comparison of occupational dose estimates for TMI-2 recovery operation, 8: 43787 (R:US)
Repair
Comparison of occupational dose estimates for TMI-2 recovery operation, 8: 43787 (R:US)

THROAT
See PHARYNX

THULIUM 156
E1-Transitions
Decay of mass-separated ^{156}Yb, 8: 45013 (J:US)

THULIUM BORIDES
Magnetic Properties
Neutron-diffraction study of the magnetic ordering in superconducting $TmRh_4B_4$, 8: 44253 (J:US)
Neutron Diffraction
Neutron-diffraction study of the magnetic ordering in superconducting $TmRh_4B_4$, 8: 44253 (J:US)
Superconductivity
Neutron-diffraction study of the magnetic ordering in superconducting $TmRh_4B_4$, 8: 44253 (J:US)

THYROID
Positron Computed Tomography
In vivo imaging of the human thyroid with the Rutherford positron camera using ^{124}I, 8: 44777 (R:GB)

THYROID HORMONES
Receptors
Binding of the rat liver thyroid hormone nuclear receptor to deoxyribonucleic acid using a gel filtration assay, 8: 44803 (B:ZA)

TIGHT SANDS
See SANDSTONES

TIME PROJECTION CHAMBERS
See PROJECTION SPARK CHAMBERS
TIME-OF-FLIGHT SPECTROMETERS
Solid Scintillation Detectors
Neutron scintillation detector for the time-of-flight spectrometry, 8: 44592 (R:SU:In Russian)
TIN
Charged-Particle Transport
Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8: 45041 (RA:DE)
Neutron Transport
Measurement of parity non-conserving neutron spin rotation in lead and tin, 8: 45053 (J:NL)
TIN 116 TARGET
Sulfur 32 Reactions
Prompt compound nuclear K X-rays in fusion reactions induced by a heavy projectile, 8: 45010 (J:NL)
TIN 120 TARGET
Pion Minus Reactions
Observation of the nuclear isovector monopole resonance, 8: 45004 (J:US)
Pion Plus Reactions
Observation of the nuclear isovector monopole resonance, 8: 45004 (J:US)
Sulfur 32 Reactions
Prompt compound nuclear K X-rays in fusion reactions induced by a heavy projectile, 8: 45010 (J:NL)
TIN 124 TARGET
Sulfur 32 Reactions
Prompt compound nuclear K X-rays in fusion reactions induced by a heavy projectile, 8: 45010 (J:NL)
TIN COMPOUNDS
See also TIN SELENIDES
Electronic Specific Heat
Electronic density of states and T/sub c/ in Nb_3Sn under pressure, 8: 44226 (J:US)
Magnetic Susceptibility
Simple scaling behavior in the magnetic susceptibility of $CeSn_3$ under high pressure, 8: 44224 (J:US)
Transition Temperature
Electronic density of states and T/sub c/ in Nb_3Sn under pressure, 8: 44226 (J:US)
TIN SELENIDES
Crystal Growth
Semiconductor eutectics for energy conversion. Final report, 8: 43511 (R:US)
Electrical Properties
Semiconductor eutectics for energy conversion. Final report, 8: 43511 (R:US)
TITANIUM
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
Sputtering
Effect of oxygen monolayer coverages on titanium sputtering yields as determined by simultaneous laser fluorescence and auger measurements, 8: 45198 (R:US)
Sputtering of titanium and its alloys by 1 to 6 keV He ions, 8: 44845 (RA:SU:In Russian)
Surface Coating
Effect of oxygen monolayer coverages on titanium sputtering yields as determined by simultaneous laser fluorescence and auger measurements, 8: 45198 (R:US)
TITANIUM ALLOYS
See also INCONEL X750
Crystal Defects
Effect of high-energy chemical bond-particle irradiation on electron-positron annihilation in deformed titanium alloys, 8: 44165 (RA:SU:In Russian)
Physical Radiation Effects
Effect of high-energy chemical bond-particle irradiation on electron-positron annihilation in deformed titanium alloys, 8: 44165 (RA:SU:In Russian)
Sputtering
Sputtering of titanium and its alloys by 1 to 6 keV He ions, 8: 44845 (RA:SU:In Russian)
TITANIUM COMPOUNDS
See also TITANIUM HYDRIDES
Electronic Specific Heat
Solitons in quantum-spin systems, 8: 44225 (J:US)
Magnetization
Solitons in quantum-spin systems, 8: 44225 (J:US)
Paramagnetism
Solitons in quantum-spin systems, 8: 44225 (J:US)
TITANIUM HYDRIDES
Equations of State
Equation of state of TiH_3. Progress report, 8: 44244 (R:US)
Surface Properties
Some future directions for metal hydride surface studies: electrons as probes of hydrogen, 8: 44255 (J:CH)
TLD (DOSEMETERS)
See THERMOLUMINESCENT DOSEMETERS
TLD (DOSIMETRY)
See THERMOLUMINESCENT DOSIMETRY
TLD SYSTEMS
See THERMOLUMINESCENT DOSEMETERS
TMPN
See HYDROXY COMPOUNDS
TMX DEVICES
End Effects
Radial transport, end loss, and ambipolarity in tandem mirrors, 8: 45159 (J:US)
Energy Balance
Energy confinement studies in the tandem mirror experiment (TMX): Power flow, 8: 45169 (J:US)
Energy confinement studies in the tandem mirror experiment (TMX): Power balance, 8: 45170 (J:US)
Equilibrium
Numerical magnetohydrodynamic studies of magnetic mirrors, 8: 45181 (J:US)
ICR Heating
Monte Carlo studies of tandem-mirror plasmas interacting with waves in the ion-cyclotron range of frequencies (ICRF). Progress report, April 1, 1983-June 30, 1983, 8: 45099 (R:US)
Magnetohydrodynamics
Numerical magnetohydrodynamic studies of magnetic mirrors, 8: 45181 (J:US)
Microwave Amplifiers
TMX upgrade ECRH schematic, 8: 45202 (RA:US)
Operation
Energy confinement studies in the tandem mirror experiment (TMX): Power balance, 8: 45170 (J:US)
Plasma Confinement
Comment on tandem-mirror transport, 8: 45190 (J:US)
Radial transport, end loss, and ambipolarity in tandem mirrors, 8: 45159 (J:US)
Plasma Diagnostics
Operation of the tandem-mirror plasma experiment with skew neutral-beam injection, 8: 45187 (J:US)
Plasma Production
Operation of the tandem-mirror plasma experiment with skew neutral-beam injection, 8: 45187 (J:US)
Power
Energy confinement studies in the tandem mirror experiment (TMX): Power flow, 8: 45169 (J:US)
TOKAMAK DEVICES
See also ALCATOR DEVICE
JFT-2 TOKAMAK
SPHEROMAK DEVICES
Computer Calculations
Program for numerical calculation of the plasma parameters in a tokamak reactor with fast atom beam injection, 8: 45105 (R:SU:In Russian)
Control Systems
Electromagnetic processes in a resonance invertor of a feedback system, 8: 45222 (R:SU:In Russian)
Data Acquisition Systems
Andromeda - the system for the acquisition and numerical data processing and its application for experimental device tokamak TM-1-MH, 8: 45120 (RA:CS)
Divertors
First experiments on the TO-2 tokamak with a divertor, 8: 45224 (R:SU:In Russian)

Drift Instability
Electromagnetic drift modes driven by pressure gradients in tokamaks, 8: 45174 (J:US)
Kinetic theory of the anomalous transport, 8: 45142 (RA:JP)
Phenomenological theory of the anomalous transport in tokamaks, 8: 45141 (RA:JP)
ECR Heating
High-frequency plasma heating in tokamak FT-1 at overcritical density. I., 8: 45115 (RA:CS:In Russian)
High-frequency plasma heating in tokamak FT-1 at overcritical density. II., 8: 45116 (RA:CS:In Russian)
Energy Balance
Energy balance in TM-1-MH tokamak (ohmical heating), 8: 45122 (RA:CS)
Program for numerical calculation of the plasma parameters in a tokamak reactor with fast atom beam injection, 8: 45105 (R:SU:In Russian)
Impurities
Simulation of inertial and beam-driven effects on impurities in tokamak plasmas, 8: 45147 (R:US)
Joule Heating
Electron thermal conduction in a tokamak when Joule heating, 8: 45155 (R:SU:In Russian)
Lower Hybrid Heating
Hf apparatus for plasma heating at lower hybrid resonance on tokamak T-7, 8: 45242 (RA:CS)
Investigation of lower hybrid resonance heating in tokamak FT-1 and FT-2, 8: 45114 (RA:CS:In Russian)
Lower-hybrid heating experiment on the TM-1-MH tokamak, 8: 45117 (RA:CS)
Power spectrum optimization of the three-waveguide grill for the T-7 tokamak, 8: 45243 (RA:CS)
Short wavelength lower hybrid waves nonlinearly excited due to ponderomotive density modulation, 8: 45118 (RA:CS)
Magnet Coils
Equilibrium of the toroidal field winding in tokamaks, 8: 45234 (RA:SU:In Russian)
Mechanical strength calculation of the disk type windings with elastic couplings by the finite element method, 8: 45235 (RA:SU:In Russian)
Toroidal magnet for a tokamak with a strong magnetic field and combined adiabatic compression of the plasma filament, 8: 45223 (R:SU:In Russian)
Neoclassical Transport Theory
Simulation of inertial and beam-driven effects on impurities in tokamak plasmas, 8: 45147 (R:US)
Neutral-Particle Transport
Monte Carlo calculation of neutral transport in Tokamaks, 8: 45196 (J:US)
Plasma Diagnostics
Soft X-ray diagnostics on tokamak TM-1-MH, 8: 45121 (RA:CS)
Space potential, temperature, and density profile measurements on RENTOR, 8: 45101 (R:US)
Plateau Regime
Calculation of parallel viscosity in the plateau regime, 8: 45177 (J:US)
Research Programs
Tokamak research in the Soviet Union, 8: 45241 (RA:CS)
Thermal Stresses
Analysis of the stress of a tokamak device vacuum chamber depending on the position of supports, 8: 45232 (RA:SU:In Russian)
USSR
Tokamak research in the Soviet Union, 8: 45241 (RA:CS)

TOKAMAK FUSION TEST REACTOR
See TFTR REACTORS

TOKAMAK TYPE REACTORS
See also DOUBLET REACTORS
ISX TOKAMAK
JT-60 REACTORS
PLT DEVICES
TFTR REACTORS
Beam Injection Heating
Study of transport mechanisms for energetic-ion heating of INTOR-size tokamaks. Final technical report, 2 June 1982-31 May 1983, 8: 45098 (R:US)
Breeding Blankets
Methodology for Monte Carlo geometrical perturbation analysis with application to a process heat fusion blanket, 8: 45282 (J:US)
Design
FED-A, an advanced performance FED based on low safety factor and current drive, 8: 45256 (R:US)
Magnetic Field Ripples
Ripple-reduction poloidal-field coils for tokamak reactors, 8: 45218 (R:US)
Neutron Transport
Neutron streaming through straight and single bend slots, 8: 45255 (R:US)
Planning
Tokamak ETR objectives, characteristics, and critical issues, 8: 45219 (R:US)
Radiation Streaming
Neutron streaming through straight and single bend slots, 8: 45255 (R:US)
Superconducting Magnets
Tokamak poloidal-field systems. Progress report, January 1-December 31, 1982, 8: 45254 (R:US)

TOLUENE
Combustion
Soot volume fraction profiles in forced-combusting boundary layers, 8: 44370 (J:US)
Decomposition
Analysis and reduction of degradation of working fluid in the Sundstrand Organic Rankine-Cycle System, 8: 44097 (R:US)

TONSILS
See PHARYNX

TOP ACCIDENTS
See TRANSIENT OVERPOWER ACCIDENTS

TORI
Magnetic Flux
Reduction of radial losses in bumpy tori, 8: 45162 (J:US)

TOROIDAL PINCH DEVICES
Equilibrium Plasma
Toroidal Extrap Equilibria, 8: 45258 (R:SE)

TORSATRON STELLARATOR
See also ATF TORSATRON
Optimization
Monte Carlo methods for optimizing torsatron configurations, 8: 45195 (J:US)

TOTAL ENERGY SYSTEMS
Distributed Collector Power Plants
Shenandoah Solar Total Energy Project, 8: 43538 (RA:US)

TOWER FOCUS POWER PLANTS
See also BARSTOW SOLAR PILOT PLANT
Molten Salts
Scoping study: molten salt solar electric experiment, 8: 43539 (RA:US)

TOWERS (EXTRACTION)
See EXTRACTION COLUMNS

TOXIC MATERIALS
Environmental standards, 8: 43993 (RA:US)

TPC
See PROJECTION SPARK CHAMBERS

TRACE ELEMENTS
See ELEMENTS

TRACKS
See PARTICLE TRACKS

TRANSFER (HEAT)
See HEAT TRANSFER

TRANSFER (IN ENVIRONMENT)
See RADIONUCLIDE MIGRATION

TRANSFORMATIONS
One-Dimensional Calculations
Large symmetric π transformations for Hadamard transforms, 8: 45095 (J:US)

TRANSIENT OVERPOWER ACCIDENTS
Heat Transfer
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)

Hydraulics
Analysis of eventual accidents in a water experimental loop, using the Relap 4 computer code (PWR; BWR), 8: 43912 (RA:BR:In Portuguese)
Reactivity
Physics of reactor safety. Quarterly report, January-March 1983 (LMFBR), 8: 43945 (R:US)

TRANSIENT SPECIES
See REACTION INTERMEDIATES

TRANSIENTS
Heat Transfer
Investigations on the transient version of URANUS (LMFBR), 8: 43925 (RA:DE:In German)
Hydraulics
Two-dimensional model for transients calculations with phase changes in sodium cooled reactors, 8: 43920 (RA:BR:In Portuguese)
Simulation
Development of a computer code for transients simulation in PWR type reactors, 8: 43921 (RA:BR:In Portuguese)
Two-Phase Flow
Two-dimensional model for transients calculations with phase changes in sodium cooled reactors, 8: 43920 (RA:BR:In Portuguese)

TRANSISTORS
See also FIELD EFFECT TRANSISTORS
MOS TRANSISTORS
Breakdown
Avalanche devices state-of-the-art, 8: 44454 (R:US)

TRANSITION ELEMENT COMPLEXES
See also COBALT COMPLEXES
COPPER COMPLEXES
IRON COMPLEXES
NICKEL COMPLEXES
OSMIUM COMPLEXES
RUTHENIUM COMPLEXES
Infrared Spectra
Isotopic labelling applied to the infrared spectra of metal complexes, 8: 44345 (B:ZA)

TRANSMISSION (DATA)
See DATA TRANSMISSION

TRANSMISSION (HEAT)
See HEAT TRANSFER

TRANSMISSION LINES
See POWER TRANSMISSION LINES

TRANSPORT (ATOMS)
See ATOM TRANSPORT

TRANSPORT (CHARGED-PARTICLE)
See CHARGED-PARTICLE TRANSPORT

TRANSPORT THEORY
See also CHARGED-PARTICLE TRANSPORT THEORY
NEUTRON TRANSPORT THEORY
Theory of drift instabilities and the associated anomalous transport, 8: 45143 (R:JP)
Monte Carlo Method
Vectorized Monte Carlo photon transport, 8: 45049 (R:US)

TRANSPORTATION SECTOR
Agriculture
Energy utilization in the transport of gardening products, 8: 44090 (R:DE:In German)
Energy Consumption
Energy utilization in the transport of gardening products, 8: 44090 (R:DE:In German)

TRANSPORTATION SYSTEMS
Environmental Impacts
Land use and transportation impact on air quality, 8: 43996 (RA:US)

TRANSURANIUM WASTES
See ALPHA-BEARING WASTES

TREES
Harvesting
Sour felling, 8: 43502 (R:SE:In Swedish)

TRICHODERMA REESEI
See TRICHODERMA VIRIDE

TRICHODERMA VIRIDE
Continuous Culture
Cellulase production in continuous and fed-batch culture by Trichoderma reesei MCG80, 8: 44782 (J:US)

TRINIDAD AND TOBAGO
Natural Gas Deposits
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
Petroleum Deposits
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)

TRIPLET PARTICLES
See QUARKS

TRITIUM
Plumes
Ground-water surveillance at the Hanford Site for CY 1982, 8: 44748 (R:US)

TRITIUM TARGET
Photonuclear Reactions
Threshold pion photoproduction from the trinucleon, 8: 44947 (J:NL)

TRITON REACTIONS
Compound-Nucleus Reactions
Structure of ^{209}Bi deduced from the ^{208}Pb(t,2nγ) reaction, 8: 45017 (J:US)
Pickup Reactions
Single proton structure of /sup 193,195,197/Ir and perturbed spin(6) symmetry, 8: 45019 (J:US)
Stripping
$0^+ \rightarrow 0^-$ beta decay of ^{16}C, 8: 44987 (J:US)
Two-step contributions in the ^{206}Pb(t,p) ^{208}Pb two-neutron transfer reaction, 8: 45018 (J:US)

TRIUMF CYCLOTRON
Meson Factories
TRIUMF kaon factory, 8: 44480 (R:CA)

TRI-UNIVERSITY MESON FACILITY
See TRIUMF CYCLOTRON

TROMBE WALLS
Air Flow
Analytical and experimental investigation of the Trombe wall, 8: 43568 (RA:US)
Demonstration Programs
Mennonite Nursing Home passive solar demonstration project, 8: 43602 (RA:US)
Design
Simulation and design of solar energy systems, 8: 43575 (RA:US)
Performance
Libertytown solar demonstration home, 8: 43576 (RA:US)
Simulation and design of solar energy systems, 8: 43575 (RA:US)
Temperature Distribution
Analytical and experimental investigation of the Trombe wall, 8: 43568 (RA:US)

TRU WASTES
See ALPHA-BEARING WASTES

TRX-1
See REVERSE-FIELD PINCH

TSL PROCESS
Coal liquefaction technology development in NEDO, 8: 43156 (RA:US)
Logic, technology and effect of coal liquefaction conditions on final up-graded product slate (29 references; design philosophy and sequential procedure), 8: 43157 (RA:US)
Pilot Plants
Quarterly technical progress report, January 1-March 31, 1983, 8: 43178 (R:US)

TUBES
For objects of tubular shape; not for DRIFT TUBES, ELECTRON TUBES or IMAGE STORAGE TUBES.
See also PRESSURE TUBES
Boiling
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 1. Main report and Appendices A-D, 8: 44429 (R:US)
Measurement of axially varying nonequilibrium in post-critical-heat-flux boiling in a vertical tube. Volume 2. Appendix E, 8: 44430 (R:US)

Deformation
Plastic instability in short tubes with internal pressure, 8: 44381 (R:BR:In Portuguese)
Eddy Current Testing
Eddy-current inspection for steam-generator-tubing program. Annual progress report for period ending December 31, 1982 (PWR), 8: 43785 (R:US)
Mechanical Vibrations
Leakage-flow-induced vibration of a tube-in-tube slip joint (LMFBR), 8: 43799 (R:US)
Plasticity
Plastic instability in short tubes with internal pressure, 8: 44381 (R:BR:In Portuguese)

TUBES (CONDUITS)
See PIPES

TUFF
Geotechnical instrumentation requirements for atdepth testing and repository monitoring in tuff, 8: 43388 (J:US)
Geochemistry
Research and development related to the Nevada Nuclear Waste Storage Investigations. Progress report, October 1-December 31, 1982, 8: 43359 (R:US)
Hydrology
Hydrology of sealing a repository in saturated tuff, 8: 43386 (R:US)

TUMORS
See NEOPLASMS

TUNGSTEN
Auger Electron Spectroscopy
Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8: 44205 (J:US)
Electron Diffraction
Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8: 44205 (J:US)
Ion Collisions
Surface scattering of MeV He^+ ions from W(100) and Si(100) monocrystals, 8: 44856 (RA:SU)
Ion Implantation
Vacancy annealing stage in heavy ion implanted bcc metals (70 keV Xe ions), 8: 44149 (RA:SU)
Physical Radiation Effects
Some peculiarities of blister formation in metals under hydrogen ion bombardment, 8: 44155 (RA:SU:In Russian)
Which atomic processes dominate plasma wall interaction, 8: 44152 (RA:SU)
Positrons
Observation of defects associated with the Cu/W(110) interface as studied with variable-energy positrons, 8: 44205 (J:US)
Sputtering
Comparative studies of the energy distribution of neutral atoms sputtered from a NiW-alloy and from elemental Ni and W by 2.5 keV Ar^+ ions, 8: 44848 (RA:SU)

TUNGSTEN ALLOYS
See also TUNGSTEN BASE ALLOYS
Sputtering
Comparative studies of the energy distribution of neutral atoms sputtered from a NiW-alloy and from elemental Ni and W by 2.5 keV Ar^+ ions, 8: 44848 (RA:SU)

TUNGSTEN BASE ALLOYS
Physical Radiation Effects
Atomic-resolution study of homogeneous radiation-induced precipitation in a neutron-irradiated W-10 at. % Re alloy. MSC report No. 5014, 8: 44129 (R:US)
Positron interaction with radiation defects in W-Re alloys (50 MeV gamma radiation), 8: 44164 (RA:SU:In Russian)

TURBINE BLADES
Boundary Layers
Notes in turbomachinery. Pt. 2. Experimental and theoretical methods, 8: 44466 (R:DK)
Composite Materials
Weight and cost analysis of large wind turbine rotors constructed from conventional materials and from advanced composite materials, 8: 43714 (R:NL:In Dutch)
Compressible Flow
Notes in turbomachinery. Pt. 3. Basic relationships, 8: 44467 (R:DK)
Construction
GROWIAN - rotor blades, 8: 43690 (RA:DE:In German)
Cost
Weight and cost analysis of large wind turbine rotors constructed from conventional materials and from advanced composite materials, 8: 43714 (R:NL:In Dutch)
Design
Concentration of wind power in turbulent fields and their utilization for the production of energy, 8: 43700 (RA:DE:In German)
Dynamics
100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results, 8: 43706 (R:US)
Materials
GROWIAN - rotor blades, 8: 43690 (RA:DE:In German)
Mathematical Models
Notes in turbomachinery. Pt. 2. Experimental and theoretical methods, 8: 44466 (R:DK)
Notes in turbomachinery. Pt. 3. Basic relationships, 8: 44467 (R:DK)
Mechanical Vibrations
100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results, 8: 43706 (R:US)
Research Programs
Blade technology programme for large wind power stations, 8: 43699 (RA:DE:In German)
Testing
100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results, 8: 43706 (R:US)
Turbulent Flow
Concentration of wind power in turbulent fields and their utilization for the production of energy, 8: 43700 (RA:DE:In German)

TURBOMACHINERY
Design
Notes in turbomachinery. Pt. 2. Experimental and theoretical methods, 8: 44466 (R:DK)
Flow Models
Notes in turbomachinery. Pt. 1. Design examples, 8: 44465 (R:DK)
Fluid Flow
Notes in turbomachinery. Pt. 2. Experimental and theoretical methods, 8: 44466 (R:DK)

TURBOMOLECULAR PUMPS
Vacuum system of the Heliotron E high temperature plasma system, 8: 45250 (RA:JP:In Japanese)

TURBULENT FLOW
Forced Convection
Transfer coefficients for turbulent flow between parallel plates, 8: 44425 (R:BR:In Portuguese)
Mathematical Models
Mathematical model for the calculation of internal turbulent flow, 8: 44906 (R:BR:In Portuguese)
Thermal Diffusivity
Utilization of axisymmetrical models in the description of the fluctuating temperature field and in the calculation of turbulent thermal diffusivity, 8: 44421 (R:BR:In Portuguese)

TURKEY
Research Programs
Progress report 1981, 8: 45285 (R:TR:In Turkish, English)
Progress report of Cekmece Nuclear Research and Training Center for 1981, 8: 45286 (R:TR:In Turkish)

TURTLES
Eggs
Parental investment in the chicken turtle (Deirochelys reticularia), 8: 44785 (J:US)

TVA
See TENNESSEE VALLEY AUTHORITY

TWO-PHASE FLOW
Severe slugging in two-phase flow systems, 8: 43290 (R:NO)

Heat Transfer
Survey of studies on the flow and heat transfer of two-component, two-phase flow of liquid metal in magnetic field, 8: 45268 (RA:JP:In Japanese)

TYPE-I SUPERCONDUCTORS
Critical Field
Ginzburg-Landau equations, interphase surface energy, and the intermediate state of superconductors with a paramagnetic normal state, 8: 45079 (J:US)
Paramagnetism
Ginzburg-Landau equations, interphase surface energy, and the intermediate state of superconductors with a paramagnetic normal state, 8: 45079 (J:US)

TYPE-II SUPERCONDUCTORS
Critical Field
Ginzburg-Landau equations, interphase surface energy, and the intermediate state of superconductors with a paramagnetic normal state, 8: 45079 (J:US)
Magnetic Flux
Transient flux flow voltages in type II superconductors, 8: 45078 (J:US)
Paramagnetism
Ginzburg-Landau equations, interphase surface energy, and the intermediate state of superconductors with a paramagnetic normal state, 8: 45079 (J:US)
Transients
Transient flux flow voltages in type II superconductors, 8: 45078 (J:US)

TYPE-III SUPERCONDUCTORS
See TYPE-II SUPERCONDUCTORS

U

UCLLL
See LAWRENCE LIVERMORE LABORATORY

U-GAS PROCESS
Construction
Memphis industrial fuel gas demonstration plant, 8: 43181 (RA:US)
Demonstration Plants
Memphis industrial fuel gas demonstration plant, 8: 43181 (RA:US)
Design
Memphis industrial fuel gas demonstration plant, 8: 43181 (RA:US)
Flowsheets
Memphis industrial fuel gas demonstration plant, 8: 43181 (RA:US)

ULTRAHIGH VACUUM
Meetings
Proceedings of the 3rd meeting on ultra high vacuum techniques for accelerators and storage rings, Tsukuba, January 24-25, 1980, 8: 44448 (R:JP:JA)

ULTRAHIGH-SPEED PHOTOGRAPHY
High speed motion-picture photography. Instrumentation and application, 8: 44629 (R:FR:In French)

ULTRASONIC TESTING
In-service inspection of reactors, 8: 43763 (R:FR:In French)

ULTRAVIOLET RADIATION
Biological Radiation Effects
Influence of enhanced UV-B irradiation on the growth and composition of plants, 8: 44790 (R:DE:In German)

ULYANOVSK REACTOR VK-50
See VK-50 REACTOR

UMM AL QAIWAN
See UNITED ARAB EMIRATES

UNDERGROUND GASIFICATION
See IN-SITU GASIFICATION

UNDERGROUND MINING
See also LONGWALL MINING
Electrical Equipment
Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8: 43247 (R:DE:In German)
Mine Roadways
Development of the seam, 8: 43251 (R:DE:In German)
Safety Engineering
Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8: 43247 (R:DE:In German)
Systems Analysis
Partially automated colliery. Development and introduction of an integrated control and monitoring system for machinery and electrical installations in hard coal deep mines, 8: 43247 (R:DE:In German)

UNDERGROUND POWER TRANSMISSION
Superconducting Cables
Brookhaven superconducting power transmission system, 8: 44397 (J:US)

UNIFIED GAUGE MODELS
Composite Models
Constraints from unification of interactions in a class of composite models, 8: 44960 (J:NL)
Higgs Bosons
Higgs-boson effects in grand unified theories, 8: 44944 (J:US)

UNIPOLAR TRANSISTORS
See FIELD EFFECT TRANSISTORS

UNITED ARAB EMIRATES
Natural Gas Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)
Petroleum Deposits
Petroleum resources of the Middle East. Foreign Energy Supply Assessment Program Series, 8: 44036 (R:US)

UNITED STATES OF AMERICA
See USA

UNIVERSE
Cosmological Models
Early universe and high-energy physics, 8: 44831 (J:US)
Unified-Field Theories
Early universe and high-energy physics, 8: 44831 (J:US)

UNIVERSITIES
See EDUCATIONAL FACILITIES

URALS ATOMIC POWER STATION
See BELOYARSK-3 REACTOR

URANIUM
Chemical Activation
Studies on unusually reactive metal powders. Preparation of new organometallic and organic compounds including potential new catalysts. Progress report, 8: 44349 (R:US)
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Ion Exchange Chromatography
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B:DE:In German)
Leaching
Processing, microstructure, leaching, and long-term stability studies related to titanate high-level waste forms, 8: 43384 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Potentiometry
Determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions by potentiometric titration, 8: 44328 (R:US)
Protective Coatings
Corrosion-resistant uranium, 8: 44209 (P:US)
Radioecological Concentration
Background radioactivity from natural occurrences: a preliminary review, 8: 44717 (R:US)

Recovery
Process for recovering uranium contained in phosphate compounds, 8: 43326 (TG:US)
Thermodynamics
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B:DE:In German)
Transport
Logistics of Australian uranium in the world market, 8: 43332 (R:DE)

URANIUM 235
Gamma Radiation
Gamma intensities for ^{226}Ra and daughters, and ^{235}U, 8: 45027 (J:NL)
Gas Centrifugation
Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8: 43329 (R:US)
Gaseous Diffusion Process
Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8: 43329 (R:US)
Group Constants
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8: 43842 (R:XA)
Laser Isotope Separation
Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8: 43329 (R:US)
Separation Nozzle Method
Nuclear-fuel-cycle education: Module 3. Enrichment of uranium, 8: 43329 (R:US)

URANIUM 236
Energy Levels
Electron capture decay of ^{237}Pu, ^{235}Np, and ^{236}Np, 8: 45025 (J:US)

URANIUM 238
Group Constants
Calculation of multigroup constants in WIMS format with programs fedgroup and flange and comparison of the results obtained using different evaluated libraries, 8: 43842 (R:XA)

URANIUM 238 BEAMS
Stopping Power
Stopping powers and ranges of (0.1-2.4) GeV uranium ions in solids, 8: 45041 (RA:DE)

URANIUM ALLOYS
See also URANIUM BASE ALLOYS
Photoelectron Spectroscopy
f-band dispersion in UIr_3: An angle-resolved and resonant photoemission study, 8: 44223 (J:US)
Protective Coatings
Corrosion-resistant uranium, 8: 44209 (P:US)

URANIUM BASE ALLOYS
Electric Conductivity
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_2 alloy, 8: 44213 (J:US)
Magnetic Susceptibility
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_2 alloy, 8: 44213 (J:US)
Specific Heat
Specific heat, magnetic susceptibility, and resistivity of an U/sub 0.85/La/sub 0.15/Al_2 alloy, 8: 44213 (J:US)

URANIUM CARBIDES
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Creep
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Fracture Properties
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)

URANIUM DEPOSITS
Aerial Prospecting
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II B. Detail area, 8: 43315 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II B. Detail area, 8: 43316 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II C. Detail area, 8: 43317 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II B. Detail area, 8: 43318 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Final report Volume II A. Detail area, 8: 43319 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango C, Colorado. Final report Volume II A. Detail area, 8: 43320 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II C. Detail area, 8: 43321 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango D, Colorado. Final report Volume II A. Detail area, 8: 43322 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango B, Colorado. Final report Volume II A. Detail area, 8: 43323 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, Colorado. Volume II B. Detail area. Final report, 8: 43324 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Durango A, B, C, and D, Colorado. Volume I. Detail area. Final report, 8: 43314 (R:US)
Airborne gamma-ray spectrometer and magnetometer survey, Dryden, Texas; Indian Wells, Texas. Volume I. Detail area. Final report, 8: 43312 (R:US)
Exploration
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Statistical data of the uranium industry, 8: 43310 (R:US)
Geography
Geography - outline of deposits, where they are, how much they contain, 8: 43311 (R:AU)

URANIUM DIOXIDE
Creep
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Degassing
Thermal release of volatile fission products from irradiated nuclear fuel, 8: 43375 (R:US)
Fission Product Release
Thermal release of volatile fission products from irradiated nuclear fuel, 8: 43375 (R:US)
Fluorination
Production of UO_2, UO_2, and UF_4, 8: 43328 (TJ:US)
Fracture Properties
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Production
Production of UO_2, UO_2, and UF_4, 8: 43328 (TJ:US)

URANIUM HEXAFLUORIDE
Absorption Spectra
Visible and ultraviolet absorption spectrum of UCl_6 dissolved in liquid Xe, 8: 44313 (J:US)
Monitoring
Remote data acquisition and storage of periodic liquid uranium hexafluoride assay enrichments, 8: 43413 (R:US)
Ultraviolet Spectra
Visible and ultraviolet absorption spectrum of UCl_6 dissolved in liquid Xe, 8: 44313 (J:US)
Visible Spectra
Visible and ultraviolet absorption spectrum of UCl_6 dissolved in liquid Xe, 8: 44313 (J:US)

URANIUM IONS
Charge Distribution
Equilibrium charge states of uranium at relativistic energies, 8: 44880 (R:US)
Multicharged Ions
Equilibrium charge states of uranium at relativistic energies, 8: 44880 (R:US)
Stopping Power
Observation of large deviations from the Bethe-Bloch formula for relativistic uranium ions, 8: 45052 (J:US)
URANIUM MILLS
See FEED MATERIALS PLANTS
URANIUM ORES
Exports
Government development and export policies, 8: 44017 (R:AU)
Milling
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Mining
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Ore Processing
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Statistical data of the uranium industry, 8: 43310 (R:US)
URANIUM OXIDES
See also URANIUM DIOXIDE
URANIUM TRIOXIDE
Chemical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Physical Properties
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Quantitative Chemical Analysis
Determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions by potentiometric titration, 8: 44328 (R:US)
URANIUM RESERVES
Nuclear-fuel-cycle education: Module 2. Exploration, reserve estimation, mining, milling, conversion, and properties of uranium, 8: 43309 (R:US)
Resource Assessment
Statistical data of the uranium industry, 8: 43310 (R:US)
URANIUM TETRAFLUORIDE
Absorption Spectra
Photoacoustic and absorption spectra of UF_4, 8: 44312 (J:US)
Infrared Spectra
Photoacoustic and absorption spectra of UF_4, 8: 44312 (J:US)
Photoacoustic Spectroscopy
Photoacoustic and absorption spectra of UF_4, 8: 44312 (J:US)
Production
Production of UO_2, UO_3, and UF_4, 8: 43328 (TJ:US)
Visible Spectra
Photoacoustic and absorption spectra of UF_4, 8: 44312 (J:US)
URANIUM TRIOXIDE
Production
Production of UO_2, UO_3, and UF_4, 8: 43328 (TJ:US)
URANYL NITRATES
Quantitative Chemical Analysis
Determination of uranium in uranium metal, uranium oxides, and uranyl nitrate solutions by potentiometric titration, 8: 44328 (R:US)
URBAN AREAS
Passive Solar Heating Systems
Solar Cities and Towns Program, 8: 43487 (RA:US)
US AEC
Includes all AEC-associated organizations.
See also LASL
LAWRENCE LIVERMORE LABORATORY
ROCKY FLATS PLANT
SAVANNAH RIVER PLANT
Historical Aspects
History of the Atomic Energy Commission, 8: 43743 (R:US)
US ATOMIC ENERGY COMMISSION
See US AEC
US DOE
See also HANFORD RESERVATION
IDAHO NATIONAL ENGINEERING LABORATORY
LASL
LAWRENCE LIVERMORE LABORATORY
NEVADA TEST SITE
PITTSBURGH ENERGY TECHNOLOGY CENTER
ROCKY FLATS PLANT
SAVANNAH RIVER PLANT
SOLAR ENERGY RESEARCH INSTITUTE
STANFORD LINEAR ACCELERATOR CENTER
US FERC
Alpha-Bearing Wastes
Characteristics of transuranic waste at Department of Energy sites, 8: 43377 (R:US)
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Low-Level Radioactive Wastes
Solid Waste Information Management System (SWIMS) data summary, fiscal year 1982, 8: 43355 (R:US)
Program Management
New directions in the US solar heating and cooling program, 8: 43482 (RA:US)
Research Programs
Department of Energy Appropriate Energy Technology projects for the US Pacific Islands. Final report, 1982, 8: 44051 (R:US)
Environmental pollution control research activities, 8: 43226 (RA:US)
United States Department of Energy thermal energy storage program, 8: 43976 (BA:NL)
US EPA
Budgets
Development of technology for environmental control, 8: 43994 (RA:US)
Mission Analysis
Mission and work programs of the Environmental Studies Division of EPA, 8: 43995 (RA:US)
Pollution Regulations
Environmental regulation of the synfuel industry, 8: 43268 (RA:US)
Overview of pollution control requirements for the US gasification industry, 8: 43267 (RA:US)
Workshop on environmental control technology for coal gasification, 8: 43225 (R:US)
Regulations
Texaco coal gasification process: leach characteristics of slags, 8: 43229 (RA:US)
Research Programs
EPA measurements and instrumentation program, 8: 43999 (RA:US)
Overview of research in the Environmental Protection Agency, 8: 43992 (RA:US)
US FERC
Commercial timesharing costs at the Federal Energy Regulatory Commission, 8: 45289 (R:US)
US NRC
United States Nuclear Regulatory Commission-prior to 1975 was part of US AEC.
Legal Aspects
Nuclear Regulatory Commission Issuances. Volume 16, No. 3, 8: 43824 (R:US)
USA
See also FEDERAL REGION IX
FEDERAL REGION VIII
FEDERAL REGION X
Economy
Energy-price dynamics and US depressions: recent analogies, 8: 43986 (R:US)
Energy Policy
Energy: everybody's business, 8: 44031 (RA:US)
Energy Supplies
SRC-I technology and its economics, 8: 43150 (RA:US)
Government Policies
Energy: everybody's business, 8: 44031 (RA:US)

SRC-I technology and its economics, 8: 43150 (RA:US)
LMFBR Type Reactors
Probabilistic analysis of alternative strategies for US FBR development, 8: 43813 (R:US)
Mining Laws
Analysis of the applicability and probable cost effectiveness of advancing longwall-mining systems in the United States. Final technical report, 8: 43248 (R:US)
Nuclear Power Plants
Licensee contractor and vendor inspection status report. Vol. 7, No. 2. Quarterly report, April 1983-June 1983, 8: 43821 (R:US)
Licensee Event Report (LER) compilation for month of June 1983, 8: 43934 (R:US)
Nuclear power attitude trends, 8: 43949 (R:US)
Nuclear Regulatory Commission Issuances. Volume 16, No. 3, 8: 43824 (R:US)
Prospects and opportunities for nuclear power regulatory reform, 8: 43825 (R:US)
Regulatory licensing status summary report. Nuclear power plants data for decisions (Blue Book), June 1-June 30, 1983, 8: 43823 (R:US)
Radioactive Waste Disposal
National waste terminal storage program: progress and status, 8: 43387 (J:US)
Uranium Reserves
Statistical data of the uranium industry, 8: 43310 (R:US)
UTAH
Salt Deposits
Exploratory shaft conceptual design report: Paradox Basin, 8: 43368 (R:US)
UTERINE CERVIX CARCINOMA
See CARCINOMAS
UTERUS
Urogenital System Diseases
Treatment of cancer of the uterus in developing countries: Proposals for a programme, 8: 44768 (R:XA)
UTILITIES
See ELECTRIC UTILITIES

V

VA CHARACTERISTIC
See ELECTRIC CONDUCTIVITY
VACUUM (0.12X10(-5) PA AND BELOW)
See ULTRAHIGH VACUUM
VACUUM (10(-8) TORR AND BELOW)
See ULTRAHIGH VACUUM
VACUUM SYSTEMS
Cryopump operations with the tokamak neutral beam injector prototype, 8: 45274 (BA:US)
Vacuum system of the Heliotron E high temperature plasma system, 8: 45250 (RA:JP:In Japanese)
Traps
Conversion of liquid-nitrogen traps to mechanical refrigeration, 8: 44449 (J:US)
VALVES
Seals
Investigations of glands for valves and slides for gases, 8: 43732 (R:DE:In German)
VANADIUM
Auger Effect
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Autolonization
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Electron Collisions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Energy-Level Transitions
Autoionization emission from transition metals by electron impact, 8: 44893 (J:US)
Equations of State
Hugoniot measurements in vanadium using the LNL two-stage light-gas gun, 8: 44201 (R:US)
Fermi Level
Influence of pressure on the Fermi surfaces of vanadium, rhenium, and rhodium, 8: 44197 (R:US)
Impact Shock
Hugoniot measurements in vanadium using the LNL two-stage light-gas gun, 8: 44201 (R:US)
VANADIUM ALLOYS
Physical Radiation Effects
Irradiation induced precipitation in palladium-base alloys. Fifth annual progress report, April 1, 1982-March 31, 1983, 8: 44133 (R:US)
VANADIUM COMPOUNDS
See also VANADIUM SILICIDES
Charge Density
Physical content of electron-charge-density distributions in A15 compounds, 8: 44308 (J:US)
VANADIUM MINERALS
See MINERALS
VANADIUM SILICIDES
Auger Effect
Line-shape analyses of XVV Auger spectra of p(1 x 1)-$V_3Si(00)$: Evidence for autoionization emission, 8: 44206 (J:US)
Autolonization
Line-shape analyses of XVV Auger spectra of p(1 x 1)-$V_3Si(00)$: Evidence for autoionization emission, 8: 44206 (J:US)
Charge Density
Physical content of electron-charge-density distributions in A15 compounds, 8: 44308 (J:US)
Electronic Structure
Line-shape analyses of XVV Auger spectra of p(1 x 1)-$V_3Si(00)$: Evidence for autoionization emission, 8: 44206 (J:US)
Energy-Level Density
Line-shape analyses of XVV Auger spectra of p(1 x 1)-$V_3Si(00)$: Evidence for autoionization emission, 8: 44206 (J:US)
VARIABLE STARS
Instability
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
Oscillation Modes
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
Pulsations
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
Star Evolution
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
Star Models
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
Stellar Atmospheres
Discovery of nonradial instability strips for hot, evolved stars, 8: 44828 (J:US)
VARISTORS
See SEMICONDUCTOR RESISTORS
VAX COMPUTERS
See DEC COMPUTERS
VEGETATION
See PLANTS
VENEZUELA
Natural Gas Deposits
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
Petroleum Deposits
Petroleum resources of Venezuela and Trinidad and Tobago, 8: 44037 (R:US)
VENTILATION DUCTS
See DUCTS

VENTILATION SYSTEMS
Control
CO_2-based ventilation in buildings, 8: 44080 (R:XE:In French and English)
VERTEBRATES
See also BIRDS
FISHES
Habitat
Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts, 8: 43286 (R:US)
Spatial Distribution
Rare, threatened, and endangered vertebrates of southwest Florida and potential OCS activity impacts, 8: 43286 (R:US)
VERTICAL AXIS TURBINES
Computerized Simulation
Study on the dynamic stress of wind energy converters with vertical axis and on starting- and overload control, 8: 43688 (RA:DE:In German)
Mathematical Models
Aeroelastic stability and dynamic response analysis of the LDB-125 vertical axis wind turbine, 8: 43716 (R:SE)
Mechanical Vibrations
Modal identification of a rotating-blade system, 8: 43721 (R:US)
Oscillation Modes
Modal identification of a rotating-blade system, 8: 43721 (R:US)
Stability
Aeroelastic stability and dynamic response analysis of the LDB-125 vertical axis wind turbine, 8: 43716 (R:SE)
VESSELS (CHEMICAL REACTIONS)
See CHEMICAL REACTORS
VESSELS (PRESSURE)
See PRESSURE VESSELS
VINYLBENZENE
See STYRENE
VISCOUS FLOW
Navier-Stokes Equations
Number of modes governing two-dimensional viscous, incompressible flows, 8: 44910 (J:US)
VISITOR CENTERS
See PUBLIC BUILDINGS
VK-50 REACTOR
Hydrodynamics
Experimental study on hydrodynamics of the up-draught part of the VK-50 boiling water reactor, 8: 43750 (R:SU:In Russian)
Primary Coolant Circuits
Experimental study on hydrodynamics of the up-draught part of the VK-50 boiling water reactor, 8: 43750 (R:SU:In Russian)
VOLCANISM
Environmental Impacts
Isolating the climatogenic effects of volcanoes, 8: 44815 (R:US)
VOLT-AMPERE CHARACTERISTIC
See ELECTRIC CONDUCTIVITY

W

WASHINGTON
See also MT ST HELENS
Basalt
Drilling history of core hole DB-15, 8: 43379 (R:US)
Biomass Plantations
The economics of hardwood fuels produced on biomass plantations, 8: 43513 (BA:US)
Temperature Inversions
Observations and models of simple nocturnal slope flows, 8: 44657 (J:US)
Wind
Observations and models of simple nocturnal slope flows, 8: 44657 (J:US)
WASTE DISPOSAL
See also RADIOACTIVE WASTE DISPOSAL
Ground Disposal
Coal conversion solid waste disposal, 8: 43221 (J:US)
WASTE MANAGEMENT
See also RADIOACTIVE WASTE MANAGEMENT
WASTE DISPOSAL
Information Systems
Industrial-waste-management information for 1982 and record-to-date, 8: 44707 (R:US)
WASTE SOLUTIONS
See LIQUID WASTES
WASTE WATER
Aeration
Treatment of alkaline wastewater from lignite-fired power plants, 8: 43200 (RA:DK)
Anaerobic Digestion
Anaerobic biological treatment of coal gasifier effluent, 8: 43446 (J:US)
Chemical Composition
Results of 4 years operation of the Texaco-Coal-Gasification-Plant at Oberhausen-Holten as developed by Ruhrkohle AG and Ruhrchemie AG, 8: 43151 (RA:US)
Environmental Effects
Environmental effects of coal gasification, 8: 43263 (RA:US)
Oxidation
Pollution control in coal gasification. Final report, June 24, 1981-April 24, 1983, 8: 43217 (R:US)
Pollution Control
Environmental control technology for aqueous effluents, 8: 43237 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Solvent Extraction
Scale-up procedures for a Scheibel extraction column, 8: 43218 (R:US)
Waste Processing
Treatment of alkaline wastewater from lignite-fired power plants, 8: 43200 (RA:DK)
Water Treatment
Consequences of an expanded use of coal in the Federal Republic of Germany. Vol. 1, 8: 43240 (R:DE:In German)
Modelling and control of blackwater treatment in coal preparation, 8: 43254 (R:US)
WASTE-FUELED POWER PLANTS
See REFUSE-FUELED POWER PLANTS
WASTE-ROCK INTERACTIONS
Interaction of groundwater and fresh basalt fissure surfaces and its effect on the migration of actinides, 8: 43393 (R:US)
WATER
See also GROUND WATER
HEAVY WATER
SEAWATER
WASTE WATER
Brillouin Effect
Brillouin scattering from H_2O: Liquid, ice VI, and ice VII, 8: 44301 (J:US)
Level Indicators
Water level sensor and temperature profile detector, 8: 43866 (P:US)
Neutron Dosimetry
Scaling neutron absorbed dose distributions from one medium to another, 8: 45061 (J:US)
Phase Studies
Coal-gasification support studies. Volume III, Task 3. Studies to improve the processing techniques of product and waste streams in coal-gasification processes. Final report, November 19, 1981-August 15, 1982, 8: 43172 (R:US)
Radiolysis
Establishing a reaction model of the irradiated carbon tetrachloride/water system, 8: 44362 (B:DE:In German)
Solids
Water content in solids, 8: 44347 (TJ:US)
Temperature Measurement
Water level sensor and temperature profile detector, 8: 43866 (P:US)

WATER BRAKES
Design
Development and testing of heat generating wind power plants for heating of buildings, 8: 43687 (RA:DE:In German)
WATER COOLANT
See WATER
WATER COOLED GRAPHITE MODERATED REACTORS
See LWGR TYPE REACTORS
WATER COOLED REACTORS
See also ARGONAUT TYPE REACTORS
ATR REACTOR
BWR TYPE REACTORS
LWGR TYPE REACTORS
ORPHEE REACTOR
ORR REACTOR
OSIRIS REACTOR
POOL TYPE REACTORS
PWR TYPE REACTORS
Reactor Materials
Role of loading variables in environment enhanced crack growth for water cooled nuclear reactor pressure vessel steels, 8: 43859 (RA:US)
WATER HEATING
See also SOLAR WATER HEATING
Solar Power Plants
Contribution of wind energy to the energy balance of a combined solar-wind power station, 8: 43686 (RA:DE:In German)
Wind Power Plants
Contribution of wind energy to the energy balance of a combined solar-wind power station, 8: 43686 (RA:DE:In German)
WATER HYACINTHS
Anaerobic Digestion
Kinetics and advanced digester design for anaerobic digestion of water hyacinth and primary sludge, 8: 43447 (J:US)
WATER MODERATED REACTORS
See also ARGONAUT TYPE REACTORS
ATR REACTOR
BWR TYPE REACTORS
ORR REACTOR
OSIRIS REACTOR
POOL TYPE REACTORS
PWR TYPE REACTORS
Reactor Materials
Fractogrpahic analysis in the understanding of corrosion fatigue mechanisms, 8: 44179 (RA:US)
Some thoughts on establishing design and inspection codes for corrosion fatigue, 8: 44187 (RA:US)
WATER MODERATOR
See WATER
WATER POLLUTION
Environmental standards, 8: 43993 (RA:US)
Environmental Transport
CHEMTRN user's manual, 8: 44744 (R:US)
Ground-water surveillance at the Hanford Site for CY 1982, 8: 44748 (R:US)
Workshop reports, 8: 44004 (RA:US)
Health Hazards
Toxicity studies of mercury in Japan, 8: 44743 (R:SE:In Swedish)
WATER POLLUTION MONITORS
Design
Tritiated-water detection with a $^{2}D(\gamma,n)^{1}H$ monitor, 8: 44569 (R:US)
Technology Assessment
Monitoring equipment. II. Survey of water monitoring instrumentation, 8: 44728 (RA:US)
WATER QUALITY
Environmental modeling of hydrologic systems, 8: 44752 (RA:US)
Information Systems
National water quality control information system (STORET), 8: 44753 (RA:US)
WATER SOLUTIONS
See AQUEOUS SOLUTIONS
WATER WALLS
Computerized Simulation
Transwall: a modular visually transparent thermal storage wall system, 8: 43623 (RA:US)
Design
Water storage tube system. Phase 2. Final project report, 8: 43639 (R:US)
Optimization
Optimum collector area to storage ratio for water wall space heating, 8: 43572 (RA:US)
Performance Testing
Passive-solar simulation analysis, 8: 43640 (R:US)
Transwall: a modular visually transparent thermal storage wall system, 8: 43623 (RA:US)
Water storage tube system. Phase 2. Final project report, 8: 43639 (R:US)
WATERBORNE PARTICLES
See PARTICULATES
WAVE EQUATIONS
Analytical Solution
Two-dimensional, steady-state diffusion of a passive scalar in a flow field, 8: 44950 (J:US)
WAZ 16
See NICKEL BASE ALLOYS
WEAKLY IONIZED GASES
Ionization factor under 10(-4).
Drift Instability
Nonlinear theory of drift instability, 8: 45139 (RA:JP)
WEAR
Tracer Techniques
Testing of the antiwear properties of synthetic engine oils by the use of radionuclide technique, 8: 44608 (R:DE:In German)
WECS
See WIND TURBINES
WELDED JOINTS
Crack Propagation
Fatiue crack growth through typical weld HAZ microstructures of SA 533 Gr. B steel in BWR water environment, 8: 43754 (RA:US)
Corrosion fatigue crack growth of pressure vessel welds in PWR environment, 8: 43779 (RA:US)
Fatigue
Fatiue crack growth through typical weld HAZ microstructures of SA 533 Gr. B steel in BWR water environment, 8: 43754 (RA:US)
WELDING
See also SOLDERING
Aerosols
Agglomeration of welding smoke: a comparison between experiments and theoretical calculation of welding-smoke agglomeration speed, 8: 44695 (TG:US)
WELDS
See WELDED JOINTS
WELL SPACING
Regulations
Economics of extracting blanket tight-sands gas with current and improved technology, 8: 43293 (R:US)
WELLMAN-GALUSHA PROCESS
Overview of gasification technology, 8: 43179 (RA:US)
WELLS
See also OIL WELLS
Water Removal
Energy from in-situ processing of Antrim oil shale. Quarterly technical progress report, January-March 1977, 8: 43304 (R:US)
WEST GERMANY
See FEDERAL REPUBLIC OF GERMANY
WESTERN AUSTRALIA
Uranium Deposits
Lake Way uranium deposit, 8: 43307 (R:AU)
Lake Way uranium project, 8: 43308 (R:AU)
Uranium Reserves
Lake Way uranium project, 8: 43308 (R:AU)
WESTERN EUROPE
See also AUSTRIA
FEDERAL REPUBLIC OF GERMANY
FRANCE
NETHERLANDS
SCANDINAVIA
SWITZERLAND
Air Pollution
Photochemical oxidants in north-western Europe 1976-79. A pilot project, 8: 44681 (R:NO)

WESTERN REGION
See FEDERAL REGION IX
WESTINGHOUSE GASIFICATION PROCESS
Commercialization
Joint Westinghouse/SASOL commercial-scale fluidized-bed coal gasification project, 8: 43159 (RA:US)
Demonstration Plants
Joint Westinghouse/SASOL commercial-scale fluidized-bed coal gasification project, 8: 43159 (RA:US)
Design
Joint Westinghouse/SASOL commercial-scale fluidized-bed coal gasification project, 8: 43159 (RA:US)
Environmental Impacts
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Flowsheets
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Gaseous Wastes
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Liquid Wastes
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Materials
Joint Westinghouse/SASOL commercial-scale fluidized-bed coal gasification project, 8: 43159 (RA:US)
Process Development Units
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Solid Wastes
Westinghouse fluidized-bed gasification process applications: environmental considerations and controls, 8: 43234 (RA:US)
Synthesis Gas
Keystone: a viable coal-to-methanol project, 8: 43449 (RA:US)
WET-TYPE COOLING TOWERS
See COOLING TOWERS
WHISTLERS
Emission
Emission, absorption, and tunneling of whistler waves in an inhomogeneous magnetic field, 8: 45178 (J:US)
Tunneling
Emission, absorption, and tunneling of whistler waves in an inhomogeneous magnetic field, 8: 45178 (J:US)
WHOLE-BODY COUNTERS
On-Line Control Systems
Further development of detector-movement control electronics of whole-body counters, 8: 44610 (R:HU:In Hungarian)
WIND
Availability
Wind situation in coastal areas of the Federal Republic of Germany with regard to wind energy utilization (especially planning of compound systems), 8: 43674 (RA:DE:In German)
Wind situation in overseas countries with regard to utilization of wind power as a means of promoting exports of the German industry, 8: 43675 (RA:DE:In German)
Turbulence
Structure of turbulence at Maglarp 1, 8: 43676 (R:SE:In Swedish)
WIND ENERGY CONVERSION SYSTEMS
See WIND TURBINES
WIND GENERATORS
See ELECTRIC GENERATORS
WIND TURBINES
WIND POWER
Data
Evaluation of wind measurements in great altitude for the site of GROWIAN, 8: 43672 (RA:DE:In German)
Simultaneous wind speed measurements in different altitudes with high time resolution for the specification of large wind energy converters, 8: 43673 (RA:DE:In Germany)
Data Acquisition
Site selection for wind power plants, 8: 43681 (RA:DE:In German)
Energy Spectra
Evaluation of wind measurements in great altitude for the site of GROWIAN, 8: 43672 (RA:DE:In German)
Forecasting
Perspectives for wind energy in the Netherlands. National research programme 1976-1981. Results and recommendations, 8: 43666 (R:NL:In Dutch)
Measuring Methods
Site selection for wind power plants, 8: 43681 (RA:DE:In German)
Meetings
EPRI conference proceedings: solar and wind power - 1982 status and outlook, 8: 43536 (R:US)
Wind energy systems. Vol. 2, 8: 43669 (B:GB)
Research Programs
National development program Wind energy. Proposal for the years 1981 to 1990, 8: 43667 (R:NL:In Dutch)
Wind energy in the Netherlands, 8: 43668 (R:NL)
Wind power activities of Pacific Gas and Electric Company, 8: 43711 (RA:US)
Resource Assessment
Wind power activities of Pacific Gas and Electric Company, 8: 43711 (RA:US)
Site Surveys
Classification of the wind of two areas in the district of Halland, 8: 43717 (R:SE:In Swedish)
Structure of turbulence at Maglarp 1, 8: 43676 (R:SE:In Swedish)
WIND POWER PLANTS
Contribution of wind energy to the energy balance of a combined solar-wind power station, 8: 43686 (RA:DE:In German)
Modification of power system operation for significant wind generation penetration, 8: 43722 (J:US)
Comparative Evaluations
Comparative study of the operational behaviour of wind power plants of power class 10 kW, 8: 43684 (RA:DE:In German)
Computer-Aided Design
OPTIWA - optimisation of large wind power plants, 8: 43695 (RA:DE:In German)
Construction
Construction and testing of a wind park on the Cyclade island of Kythnos, 8: 43704 (RA:DE:In German)
Description of the 400 kW single-blade wind power plant 'Monopteros', 8: 43694 (RA:DE:In German)
Examination of the documents prepared for the construction of the rotor blades GROWIAN I, 8: 43691 (RA:DE:In German)
Design
Development and testing of heat generating wind power plants for heating of buildings, 8: 43687 (RA:DE:In German)
Economic Analysis
Wind-energy systems for electric utilities: a synthesis of value studies, 8: 43678 (R:US)
Economics
Measurements on a 15 kW-wind power plant. Phase 2, 8: 43685 (RA:DE:In German)
Wind situation in the inland of the Federal Republic of Germany with regard to wind power utilization (especially planning of compound systems), 8: 43682 (RA:DE:In German)
Interconnected Power Systems
Wind situation in the inland of the Federal Republic of Germany with regard to wind power utilization (especially planning of compound systems), 8: 43682 (RA:DE:In German)
Operation
Construction and operation of the large wind power plant GROWIAN I, 8: 43689 (RA:DE:In German)
Description of the 400 kW single-blade wind power plant 'Monopteros', 8: 43694 (RA:DE:In German)
Optimization
OPTIWA - optimisation of large wind power plants, 8: 43695 (RA:DE:In German)
Planning
GROWIAN - planning of the measurement- and test programme, 8: 43692 (RA:DE:In German)

Research Programs
Seminar and status report 'wind energy', 8: 43671 (R:DE:In German)
Site Selection
Representation of regions suitable for the construction of large wind power plants in the Federal Republic of Germany, 8: 43683 (RA:DE:In German)
Specifications
Construction and operation of the large wind power plant GROWIAN I, 8: 43689 (RA:DE:In German)
Technology Transfer
Development, construction and operation of a 30/100 kW wind power plant built in German-Brasilian cooperation, 8: 43703 (RA:DE:In German)
Testing
Construction and testing of a wind park on the Cyclade island of Kythnos, 8: 43704 (RA:DE:In German)
GROWIAN - planning of the measurement- and test programme, 8: 43692 (RA:DE:In German)
Turbine Blades
Blade technology programme for large wind power stations, 8: 43699 (RA:DE:In German)
Vertical Axis Turbines
Wind energy converter with high-speed vertical axis rotor and straight rotor blades, 8: 43680 (R:DE:In German)
Water Brakes
Development and testing of heat generating wind power plants for heating of buildings, 8: 43687 (RA:DE:In German)

WIND TUNNELS
Construction
Setting up a gust generator for the development of wind turbines, 8: 43698 (RA:DE:In German)

WIND TURBINES
See also VERTICAL AXIS TURBINES
Chimneys
Atmospheric-thermic solar chimneys, 8: 43701 (RA:DE:In German)
Data Acquisition Systems
Test of Tripod datalogger (Wind turbines), 8: 43720 (R:DK:In Danish)
Demonstration Plants
Atmospheric-thermic solar chimneys, 8: 43701 (RA:DE:In German)
Demonstration Programs
Wind power activities of the Bureau of Reclamation, 8: 43712 (RA:US)
Design
Operational behaviour of wind power plants. Pt. 1, 8: 43696 (RA:DE:In German)
Dynamic Loads
Normal and exceptional loads for wind turbines with horizontal axis, 8: 43679 (RA:NL:DU)
Electric Generators
Operational behaviour of wind power plants. Pt. 2, 8: 43697 (RA:DE:In German)
Feasibility Studies
Wind power activities of the Bureau of Reclamation, 8: 43712 (RA:US)
Frequency Control
An assessment of load frequency control impacts caused by small wind turbines, 8: 43723 (J:US)
International Cooperation
Construction of two wind power plants AEROMAN 11/11 for Indonesia, 8: 43702 (RA:DE:In German)
Load Management
An assessment of load frequency control impacts caused by small wind turbines, 8: 43723 (J:US)
Maintenance
Wind power operations and maintenance, 8: 43713 (RA:US)
Meetings
Wind energy systems. Vol. 1, 8: 43724 (B:GB)
Operation
Operational behaviour of wind power plants. Pt. 1, 8: 43696 (RA:DE:In German)
Wind power operations and maintenance, 8: 43713 (RA:US)
Power Coefficient
Measurement of the Cp-lambda curve of wind turbines under field conditions, 8: 43715 (R:NL:In Dutch)
Research Programs
DOE/NASA large horizontal axis wind turbine research and development, 8: 43708 (RA:US)
Domestic and foreign wind turbine research, 8: 43710 (RA:US)
Energy from the wind, 8: 43670 (TJ:GB)
Site Selection
Making use of wind energy: a course in evaluating and choosing sites for small wind machines, 8: 43719 (R:US)
Solar Air Heaters
Atmospheric-thermic solar chimneys, 8: 43701 (RA:DE:In German)
Specifications
Construction of two wind power plants AEROMAN 11/11 for Indonesia, 8: 43702 (RA:DE:In German)
Standards
Regulations for wind turbines. Inventory and proposals, 8: 43677 (R:NL:In Dutch)
Technology Assessment
Wind power: a promising future generating option, 8: 43707 (RA:US)
Testing
Setting up a gust generator for the development of wind turbines, 8: 43698 (RA:DE:In German)
Wind power converter WEC 520 'long-term 41050', 8: 43693 (RA:DE:In German)
Turbine Blades
100-kW metal wind turbine blade dynamics analysis, weight/balance, and structural test results, 8: 43706 (R:US)
Weight and cost analysis of large wind turbine rotors constructed from conventional materials and from advanced composite materials, 8: 43714 (R:NL:In Dutch)
Wind power converter WEC 520 'long-term 41050', 8: 43693 (RA:DE:In German)
Wind Loads
Setting up a gust generator for the development of wind turbines, 8: 43698 (RA:DE:In German)

WINDOWS
Heat Mirrors
Heat Mirror transparent insulation, 8: 43633 (RA:US)
Heat Transfer
Calculating heat transfer through windows, 8: 44087 (J:GB)

WINKLER PROCESS
Coal-gasification basic research and cost studies. Quarterly report No. 3, 8: 43167 (R:US)
Coal-gasification basic research and cost studies. Quarterly report 2, 8: 43168 (R:US)
Overview of gasification technology, 8: 43179 (RA:US)
Winkler fluidized-bed gasification of lignite - environmental pollution at Neyveli, 8: 43233 (RA:US)
Comparative Evaluations
Beluga methanol project: commercialization of fuel methanol from Alaskan coal using proven technology, 8: 43448 (RA:US)

WIRE SPARK CHAMBERS
Data Processing
Software for data processing from telescope of magnetostriction spark chamber in real time on the M-6000 computer, 8: 44611 (R:SU:In Russian)

WIRES
Plating
Copper plating of iron and steel wires by cementation, 8: 44240 (TJ:US)

WOLFRAM
See TUNGSTEN

WOOD
Availability
Assessment of potential wood supply for intermediate scale thermoconversion facilities, 8: 43507 (RA:US)
Combustion
Case study of a commercial small-scale wood-fueled steam boiler for textile mill operations, 8: 43474 (BA:US)
Development of wood as an alternative fuel for gas turbine systems, 8: 43472 (RA:US)

Pellets as fuel. Basic properties and experience from tests in moving grate firing units, 8: 43471 (R:SE:In Swedish)
Drying
First three years of the Department of Energy Grant. Final report (Potential of integrating the production of wood for energy into the existing forest products supply system), 8: 43493 (R:US)
Sour felling, 8: 43502 (R:SE:In Swedish)
Gasification
Steam gasification of wood in a fluidized bed using indirect heating with fire tubes, 8: 43426 (RA:US)
Support research for biomass thermal-gasification development, 8: 43422 (R:US)
Harvesting
First three years of the Department of Energy Grant. Final report (Potential of integrating the production of wood for energy into the existing forest products supply system), 8: 43493 (R:US)
Hydrogenation
Preliminary experiments on direct liquefaction of biomass by solvolysis and catalytic hydrogenation, 8: 43438 (RA:US)
Liquefaction
Advanced laboratory-scale extruder-reactor biomass liquefaction unit, 8: 43436 (RA:US)
Liquid fuels from wood by continuous operation of the Albany, Oregon biomass liquefaction facility, 8: 43441 (BA:US)
Moisture
Sour felling, 8: 43502 (R:SE:In Swedish)
Pyrolysis
Entrained flow pyrolysis of biomass, 8: 43435 (RA:US)
Fundamental pyrolysis studies, 8: 43434 (RA:US)
Resource Assessment
Assessment of potential wood supply for intermediate scale thermoconversion facilities, 8: 43507 (RA:US)
Solvolysis
Preliminary experiments on direct liquefaction of biomass by solvolysis and catalytic hydrogenation, 8: 43438 (RA:US)
Storage
First three years of the Department of Energy Grant. Final report (Potential of integrating the production of wood for energy into the existing forest products supply system), 8: 43493 (R:US)
WOOD ALCOHOL
See METHANOL
WOOD BURNING APPLIANCES
See also WOOD BURNING FURNACES
Diffusion of rural innovations: some analytical issues and the case of wood-burning stoves, 8: 44014 (J:GB)
WOOD BURNING FURNACES
Demonstration Programs
Case study of a commercial small-scale wood-fueled steam boiler for textile mill operations, 8: 43474 (BA:US)
Health Hazards
Occurrence of fungus spores in chip combustion and storage installations. II., 8: 43504 (R:NO:In Norwegian, English)
WOOD FUELS
Use of this term is limited to polcy, feasibility, and socio-economic studies. For wood properties use WOOD.
Air Pollution
Chemical characterization of emmissions from wood-fired stoves, 8: 43510 (R:NO:In Norwegian)
Combustion Products
Chemical characterization of emmissions from wood-fired stoves, 8: 43510 (R:NO:In Norwegian)
Drying
Growth of mold in fuel chips, 8: 43503 (R:SE:In Swedish)
Economic Analysis
The economics of hardwood fuels produced on biomass plantations, 8: 43513 (BA:US)
Storage
Growth of mold in fuel chips, 8: 43503 (R:SE:In Swedish)
WOOD PRODUCTS INDUSTRY
Air Pollution
Ventilation in connection with vacuum impregnation. The construction of an impregnation plant with a good working environment and energy saving for the impregnation of wood, 8: 44689 (R:SE:In Swedish)
Occupational Safety
Ventilation in connection with vacuum impregnation. The construction of an impregnation plant with a good working environment and energy saving for the impregnation of wood, 8: 44689 (R:SE:In Swedish)
WOOD WASTES
Combustion
Biomass fueled Stirling engine combustor research, 8: 43473 (RA:US)
Pellets as fuel. Basic properties and experience from tests in moving grate firing units, 8: 43471 (R:SE:In Swedish)
Fermentation
Conversion of henequen pulp to microbial biomass by submerged fermentation, 8: 43521 (J:US)
Gasification
Gasification of forest residues in a high-throughput gasifier, 8: 43427 (RA:US)
Low-Btu gas from a small-scale fluidized bed reactor using sawdust feeds, 8: 43440 (BA:US)
Pyrolysis
Ablative entrained flow fast pyrolysis status, 8: 43433 (RA:US)
WORKERS
See PERSONNEL
WWER TYPE REACTORS
Fuel Assemblies
EREBUNI: energy distribution in an NPP unit reactor with regard to neutron measurements. Pt. 1. Computation algorithms, 8: 43766 (R:SU:In Russian)
Primary Coolant Circuits
Direct measurement of physical and chemical parameters in reactor circuits at high pressure and temperature of water, 8: 43768 (RA:CS:In Czech)
Reactor Instrumentation
Direct measurement of physical and chemical parameters in reactor circuits at high pressure and temperature of water, 8: 43768 (RA:CS:In Czech)
WYOMING
Geology
Thermopolis hydrothermal system, with an analysis of Hot Springs State Park. Preliminary report No. 20, 8: 43654 (R:US)
Hydrology
Thermopolis hydrothermal system, with an analysis of Hot Springs State Park. Preliminary report No. 20, 8: 43654 (R:US)
Hydrothermal Systems
Thermopolis hydrothermal system, with an analysis of Hot Springs State Park. Preliminary report No. 20, 8: 43654 (R:US)

X

2X DEVICES
Equilibrium
Numerical magnetohydrodynamic studies of magnetic mirrors, 8: 45181 (J:US)
Ion Drift
Quasilinear theory of suprathermal ions in mirror machines in the presence of radio-frequency fluctuations, 8: 45160 (J:US)
Ion Waves
Quasilinear theory of suprathermal ions in mirror machines in the presence of radio-frequency fluctuations, 8: 45160 (J:US)
Magnetohydrodynamics
Numerical magnetohydrodynamic studies of magnetic mirrors, 8: 45181 (J:US)
X RADIATION
Synchrotron Radiation
Research with X rays, 8: 45055 (J:CS:In Czech)
Transport Theory
Vectorized Monte Carlo photon transport, 8: 45049 (R:US)

XENON
Adsorption
Persistent optical excitation to Rydberg states: Xe on Au, 8: 44210 (J:US)
Atom-Atom Collisions
Two-state models of radiative collisions and related ionization effects (Cs + Cs; Xe + Ar), 8: 44904 (J:US)
Auger Electron Spectroscopy
Persistent optical excitation to Rydberg states: Xe on Au, 8: 44210 (J:US)
Photoionization
Angular distribution of Xe 5s→εp photoelectrons: Disagreement between experiment and theory, 8: 44894 (J:US)
XENON IONS
Electron-Ion Collisions
Electron-impact excitation-autoionization in the cadmium isoelectronic sequence: A case of target term dependence in scattering theory, 8: 44890 (J:US)
Measurement of the cross section for electron-impact ionization of Xe^{6+} ions, 8: 44891 (J:US)
X-RASERS
See X-RAY LASERS
X-RAY DETECTION
CDTE Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
Semiconductor receivers of the pulse X-radiation based on cadmium telluride, 8: 44614 (RA:SU:In Russian)
HgI2 Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
X-radiation and soft gamma radiation detectors on the base of HgJ_2 crystals, 8: 44617 (RA:SU:In Russian)
Si Semiconductor Detectors
Point detectors from silicon, cadmium telluride and mercury iodide for β, X- and γ-radiation measurement, 8: 44615 (RA:SU:In Russian)
X-RAY DIFFRACTION
Corrections
Consequences of the neglect of TDS correction for temperature parameters, 8: 44646 (R:AU)
X-RAY LASERS
Population Inversion
Population inversion and gain measurements for soft x-ray-laser development in a magnetically confined plasma column, 8: 44400 (R:US)
X-RAY SPECTROMETERS
Bragg Reflection
Bragg crystal spectrometer for the soft X-ray diffuse background, 8: 44563 (R:FR)
Design
Crystal-diffraction system for spectroscopy, imaging, and interferometry of inertially confined fusion targets. Final report for the period ending January 1, 1983, 8: 45213 (R:US)
XYLANS
Fermentation
Fermentation of wheat straw hemicelluloses to ethanol by Pachysolen tannophilus, 8: 43458 (J:US)
XYLOSE
Fermentation
Comparison of Candida tropicalis and Pachysolen tannophilus for conversion of xylose to ethanol, 8: 43460 (J:US)
Fermentation of cellulose and hemicellulose carbohydrates by thermotolerant yeasts, 8: 43459 (J:US)
Production of organic acids from biomass by acid hydrolysis and fermentation, 8: 43518 (J:US)

Y

YANG-MILLS THEORY
Postulated Particles
Light scalars in N=1 locally supersymmetric theories, 8: 44957 (J:NL)
Symmetry
Hidden-symmetry algebra for the self-dual Yang-Mills equation, 8: 44961 (J:NL)
YANKEE CONNECTICUT REACTOR
See CONNECTICUT YANKEE REACTOR
YANKEE ROWE REACTOR
See ROWE YANKEE REACTOR
YEASTS
See also CANDIDA
Comparative Evaluations
Comparison of Candida tropicalis and Pachysolen tannophilus for conversion of xylose to ethanol, 8: 43460 (J:US)
Immobilized Cells
Continuous fermentation: improvement of cell immobilization by zeta potential measurement, 8: 44784 (J:US)
YOLK
See EGGS
YTTERBIUM 156
Alpha Decay
Decay of mass-separated ^{156}Yb, 8: 45013 (J:US)
Beta Decay
Decay of mass-separated ^{156}Yb, 8: 45013 (J:US)
YTTRIUM ALUMINIUM GARNETS
See ALUMINIUM OXIDES
YTTRIUM BORIDES
Auger Electron Spectroscopy
Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8: 44246 (J:US)
Chemical Bonds
Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8: 44245 (J:US)
Electronic Structure
Boron local density of states of Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ superconductors, 8: 44246 (J:US)
Magnetic Susceptibility
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Magnetization
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Specific Heat
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
Superconductivity
Charge transfer and transition-metal cluster: Boron bonding in the bct superconducting Y(Rh/sub 1-x/Ru/sub x/)$_4$B$_4$ system, 8: 44245 (J:US)
Effect of superconductivity on spin dynamics in (Y/sub 1-x/R/sub x/)Rh$_4$B$_4$, 8: 44252 (J:US)
Superconducting and magnetic properties of Y/sub 0.9/ R/sub 0.1/Rh$_4$B$_4$, 8: 44251 (J:US)
YTTRIUM SILICIDES
Specific Heat
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)
Superconductivity
Low-temperature heat capacity of superconducting ternary iron silicides, 8: 44310 (J:US)

Z

ZEA MAYS
See MAIZE

ZERO POWER REACTORS
Emergency Plans
Pajarito Plan for Radiation Emergency. Standard operating procedures, 8: 43894 (R:US)
Radiation Protection
Pajarito Plan for Radiation Emergency. Standard operating procedures, 8: 43894 (R:US)
ZINC
Biological Accumulation
Fucus Vesiculosus as a bioaccumulator of heavy metals, 8: 44807 (R:DE:In German)
ZINC ADDITIONS
Annealing
Positron studies of solute clustering and lattice defects in Al-Zn alloys, 8: 44229 (BA:NL)
ZINC COMPLEXES
Stability
Ferric ion sequestering agents. 10. Selectivity of sulfonated poly(catechoylamides) for ferric ion, 8: 44342 (J:US)
ZINC FLUORIDES
Phase Transformations
Critical behavior of a site-diluted three-dimensional Ising magnet, 8: 44293 (J:US)
ZINC OXIDES
Crystal Defects
Intrinsic defects in ZnO varistors, 8: 44287 (J:US)
Electrical Properties
Effect of oxidizing and reducing atmospheres at elevated temperatures on the electrical properties of zinc oxide varistors, 8: 44459 (J:US)
ZINC SELENIDES
Electric Conductivity
Detection of traps in high conductivity ZnSe by optical transient capacitance spectroscopy, 8: 44290 (J:US)
Traps
Detection of traps in high conductivity ZnSe by optical transient capacitance spectroscopy, 8: 44290 (J:US)
ZIRCALOY 2
Corrosion
Zircaloy behaviour in high temperature irradiated water, 8: 43793 (R:CA)
ZIRCALOY 4
Corrosion
Zircaloy behaviour in high temperature irradiated water, 8: 43793 (R:CA)
Oxidation
High-temperature oxidation of Zircaloy in hydrogen-steam mixtures, 8: 43899 (R:US)
ZIRCONIUM
Crystal Defects
Study of point defects by channeling measurements of solute atom displacements, 8: 44147 (RA:SU)
Ion Exchange Chromatography
Anion exchange in alcoholic-aqueous solutions during the production of U-232, and investigation of ionic equilibria, 8: 44332 (B:DE:In German)
Materials Testing
Device for studying dimensional changes of reactor materials during irradiation in accelerators, 8: 44159 (RA:SU:In Russian)
Physical Radiation Effects
Device for studying dimensional changes of reactor materials during irradiation in accelerators, 8: 44159 (RA:SU:In Russian)
Study of point defects by channeling measurements of solute atom displacements, 8: 44147 (RA:SU)
ZIRCONIUM 90 TARGET
Pion Minus Reactions
Observation of the nuclear isovector monopole resonance, 8: 45004 (J:US)
Proton Reactions
sup(90,92)Zr(p vector,p') reactions at Esub(p)=800 MeV, 8: 45009 (J:NL)
ZIRCONIUM 92 TARGET
Proton Reactions
sup(90,92)Zr(p vector,p') reactions at Esub(p)=800 MeV, 8: 45009 (J:NL)
ZIRCONIUM ALLOYS
Corrosion
Development of the installation for zirconium alloy corrosion testing in superheated steam flow in a reactor channel, 8: 43792 (R:SU:In Russian)
Sorptive Properties
Theory of bulk gettering, 8: 44296 (J:US)
ZIRCONIUM CARBIDES
Creep
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
Fracture Properties
SP-100 coated-particle fuel development. Phase I. Final report, 8: 43819 (R:US)
ZIRCONIUM IODIDES
Lattice Parameters
Two zicronium iodide clusters. Hexazirconium dodecaiodide (Zr_6I_{12}) and cesium hexazirconium tetradecaiodide ($CsZr_6I_{14}$), 8: 44343 (J:US)
Structural Chemical Analysis
Two zicronium iodide clusters. Hexazirconium dodecaiodide (Zr_6I_{12}) and cesium hexazirconium tetradecaiodide ($CsZr_6I_{14}$), 8: 44343 (J:US)
ZYMOMONAS MOBILIS
Immobilized Cells
Use of immobilized cells of Zymomonas mobilis in a novel fluidized bioreactor to produce ethanol, 8: 43463 (J:US)

CONTRACT NUMBER INDEX

Numbers assigned to DOE contracts under which documents announced in this publication were prepared are included in this index.

Contract No.	Abstract No.	Report No.
AC01-76ET10204	**Combustion Engineering, Inc., Windsor, CT (USA)**	
	8:43162	DOE/ET/10204—1401
AC01-76ET10617	**Carnegie-Mellon Univ., Pittsburgh, PA (USA)**	
	8:43163	DOE/ET/10617—T1
AC01-76ET20218	**Monosolar, Inc., Santa Monica, CA (USA)**	
	8:43492	DOE/ET/20218—T1
AC01-77CS28701	**Naramore, Bain, Brady, and Johanson, Seattle, WA (USA)**	
	8:44075	DOE/CS/28701—T1
AC01-77ET10386	**American Boiler Manufacturers Association, Arlington, VA**	
	8:43224	DOE/ET/10386—T1-Vol.2
AC01-77ET12478	**Ayers (Emory) Associates, Inc., New York (USA)**	
	8:43248	DOE/ET/12478—T1
AC01-78CS35221	**CCB/Cumali Associates, Oakland, CA**	
	8:43596	CONF-800972—(1980).
AC01-79CS20531	**Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research**	
	8:44068	DOE/CS/20531—T1
	Ehrenkrantz Group, New York (USA)	
	8:44069	DOE/CS/20531—T2
	Rensselaer Polytechnic Inst., Troy, NY (USA). Center for Architectural Research	
	8:44070	DOE/CS/20531—T3
	8:44071	DOE/CS/20531—T4
	8:44072	DOE/CS/20531—T5
	Ehrenkrantz Group, New York (USA)	
	8:44073	DOE/CS/20531—T6
AC01-79ET14882	**Pennsylvania State Univ., University Park (USA). Coal Research Section**	
	8:43164	DOE/ET/14882—1412
AC01-80CS24436	**IMR Corp., Falls Church, VA (USA). Energy, Management and Marketing Div.**	
	8:44032	DOE/CS/24436—T1
AC01-80CS30607	**International Business Services, Inc., Washington, DC (USA)**	
	8:44050	DOE/CS/30607—T1
AC01-80RG10446	**Decision Analysis Corp., Annandale, VA (USA)**	
	8:43262	DOE/RG/10446—T3
AC01-81CS64571	**Synectics Group, Inc., Washington, DC (USA)**	
	8:44060	DOE/CS/64571—T2
AC01-81FE15081	**Avco-Everett Research Lab., Inc., Everett, MA (USA)**	
	8:43214	DOE/FE/15081—1
	8:43215	DOE/FE/15081—T1
AC01-81RA50563	**Mitre Corp., McLean, VA (USA)**	
	8:43653	MTR—82W79
	8:43659	MTR—82W73
	8:43663	MTR—82W159
AC01-82CE40590	**Vineta, Inc., Falls Church, VA (USA)**	
	8:44094	DOE/CE/40590—T1
AC02-76CH00016	**Brookhaven National Lab., Upton, NY (USA)**	
	8:43547	BNL—51627
	Exfluor Research Corp., Austin, TX (USA)	
	8:43664	BNL—33129
	Brookhaven National Lab., Upton, NY (USA)	
	8:43818	BNL—33058
	8:43836	BNL—33149
	8:43935	NUREG/CR—2475
	8:43941	NUREG/CR—3241
	Columbia Univ., New York (USA). Dept. of Civil Engineering and Engineering Mechanics	
	8:43943	NUREG/CR—3283
	Brookhaven National Lab., Upton, NY (USA)	
	8:43944	NUREG/CR—3315
	8:44061	BNL—33292
	8:44304	Physical Review Letters 50 NO. 15. 1149-1152 (11 Apr 1983).
	8:44509	BNL—33218
	8:44510	BNL—33259
	8:44511	BNL—33272
	8:44512	BNL—33273
	8:44561	BNL—33324
	8:44896	Physical Review Letters 50 NO. 14. 1038-1041 (4 Apr 1983).
	8:44912	BNL—33263
	8:44926	Annals of Physics (New York) 146 NO. 2. 309-348 (1 Apr 1983).
	8:44937	Physical Review [Section] D: Particles and Fields 27 NO. 11. 2762-2764 (1 Jun 1983).
	8:44942	Physical Review [Section] D: Particles and Fields 27 NO. 7. 1518-1524 (1 Apr 1983).
	8:44944	Physical Review [Section] D: Particles and Fields 27 NO. 7. 1601-1612 (1 Apr 1983).
	8:44954	Physical Review [Section] D: Particles and Fields 27 NO. 8. 1956-1959 (15 Apr 1983).
	8:45011	Physical Review [Section] C: Nuclear Physics 27 NO. 5. 2292-2310 (May 1983).
	8:45028	BNL—33166
	8:45284	BNL—33010
AC02-76CH03000	**Fermi National Accelerator Lab., Batavia, IL (USA)**	
	8:44921	FERMILAB-Conf—83/54-THY/EXP
AC02-76CH03073	**Princeton University, Plasma Physics Laboratory, Princeton, New Jersey 08544**	
	8:44296	Journal of Applied Physics 54 NO. 6. 3183-3189 (Jun 1983).
	Princeton Univ., NJ (USA). Plasma Physics Lab.	
	8:44400	PPPL—2003
	8:45148	PPPL—1939
	8:45149	PPPL—2001
	8:45150	PPPL—2009
	8:45151	PPPL—2013
	8:45152	PPPL—2018
	8:45163	Physics of Fluids 26 NO. 7. 1871-1873 (Jul 1983).
AC02-76CS32588	**Univ. of Wisconsin, Madison**	
	8:43575	CONF-800972—(1980).

Contract No.	Abstract No.	Report No.
AC02-76ER00881	**Physics Department, University of Wisconsin, Madison, Wisconsin 53706**	
	8:44952	Physical Review Letters 50 NO. 16. 1181-1183 (18 Apr 1983).
	8:45092	Journal of Mathematical Physics (New York) 24 NO. 7. 1695-1699 (Jul 1983).
AC02-76ER01195	**Illinois Univ., Urbana (USA). Dept. of Physics**	
	8:44920	DOE/ER/01195—485
AC02-76ER01198	**Department of Physics and Materials Research Laboratory, University of Illinois at Urbana-Champaign,**	
	8:44291	Journal of Applied Physics 54 NO. 7. 4221-4222 (Jul 1983).
	8:44297	Journal of Applied Physics 54 NO. 6. 3216-3219 (Jun 1983).
AC02-76ER01367	**Northwestern Univ., Evanston, IL (USA). Dept. of Materials Science and Engineering**	
	8:44128	DOE/ER/01367—146
AC02-76ER02220	**The Institute for Advanced Study, Princeton, New Jersey 08540**	
	8:44955	Physical Review [Section] D: Particles and Fields 27 NO. 8. 1960-1961 (15 Apr 1983).
AC02-76ER02890	**University of Cincinnati, Cincinnati, Ohio 45221**	
	8:45078	Journal of Applied Physics 54 NO. 6. 3310-3317 (Jun 1983).
AC02-76ER03069	**College of William and Mary, Williamsburg, Virginia 23185**	
	8:44943	Physical Review [Section] D: Particles and Fields 27 NO. 7. 1556-1564 (1 Apr 1983).
	8:44959	Annals of Physics (New York) 146 NO. 1. 129-148 (Mar 1983).
AC02-76ER03075	**Stanford Linear Accelerator Center, CA (USA)**	
	8:44434	SLAC-PUB—3143
AC02-76ER03077	**Courant Institute of Mathematical Sciences, New York University, New York, New York 10012**	
	8:45181	Physics of Fluids 26 NO. 6. 1559-1563 (Jun 1983).
	8:45319	Journal of Statistical Physics 30 NO. 3. 755-783 (Mar 1983).
AC02-76ER03158	**Cornell Univ., Ithaca, NY (USA). Materials Science Center**	
	8:44129	DOE/ER/03158—108
	Cornell Univ., Ithaca, NY (USA)	
	8:44130	DOE/ER/03518—105
	8:44131	DOE/ER/03518—107
AC02-76ER03230	**Brandeis Univ., Waltham, MA (USA). Dept. of Physics**	
	8:44911	DOE/ER/03230—T2
AC02-76ER03416	**Davey Laboratory, Department of Chemistry, The Pennsylvania State University, University Park, Penns**	
	8:44337	Journal of Applied Physics 54 NO. 6. 3524-3527 (Jun 1983).
AC02-76ET11304	**Energy Research Corp., Danbury, CT (USA)**	
	8:44055	DOE/ET/11304—T8
AC02-76ET25106	**Ford Motor Co., Dearborn, MI (USA). Research Staff**	
	8:43978	COO—2566-24
AC02-76ET53004	**Rensselaer Polytechnic Inst., Troy, NY (USA). Plasma Dynamics Lab.**	
	8:45101	DOE/ET/53004—51
AC02-76ET53034	**Department of Nuclear Engineering, University of Wisconsin, Madison, Wisconsin 53706**	
	8:45183	Physics of Fluids 26 NO. 6. 1587-1595 (Jun 1983).
AC02-76EV03221	**Hebrew Univ., Jerusalem (Israel)**	
	8:44758	DOE/EV/03221—80
AC02-77CH00178	**Arkansas Univ., Fayetteville (USA). Dept. of Chemical Engineering**	
	8:43439	SERI/STR—231-1910
	Chem Systems, Inc., New York (USA)	
	8:43453	SERI/STR—231-1745
	Solar Energy Research Inst., Golden, CO (USA)	
	8:43454	SERI/TR—231-1714
	8:43481	SERI/SP—741-399
	8:43484	
	8:43491	DOE/CE—0033-1
	8:43508	SERI/TP—211-1952
	8:43509	SERI/TP—212-1970
	8:43645	SERI/TP—252-1922
	Institute of Gas Technology, Chicago, IL (USA)	
	8:43651	SERI/STR—231-1860
	Solar Energy Research Inst., Golden, CO (USA)	
	8:43678	SERI/TP—214-1976
	8:44052	SERI/TR—231-1926
AC02-77CS40057	**Thermo Electron Corp., Waltham, MA (USA)**	
	8:44104	TE—4228-97-79
AC02-78ER04650	**Institute for Theoretical Physics, University of California at Santa Barbara, Santa Barbara, Califor**	
	8:44394	Applied Physics Letters 42 NO. 12. 1045-1047 (15 Jun 1983).
AC02-78ER04996	**GTE Labs., Inc., Waltham, MA (USA)**	
	8:43646	DOE/ER/04996—4
AC02-78ER04998	**Pennsylvania State Univ., University Park (USA). Dept. of Materials Science and Engineering**	
	8:44243	DOE/ER/04998—T3
	8:44262	DOE/ER/04998—T2
AC02-78ET51013	**Massachusetts Inst. of Tech., Cambridge (USA). Plasma Fusion Center**	
	8:45100	DOE/ET/51013—80
AC02-78EV04625	**Yale Univ., New Haven, CT (USA)**	
	8:44767	DOE/EV/04625—T3
AC02-78EV04746	**Case Western Reserve Univ., Cleveland, OH (USA). Dept. of Radiology**	
	8:44359	CONF-830710—4
	Case Western Reserve Univ., Cleveland, OH (USA). Div. of Radiation Biology	
	8:44787	CONF-830710—3
AC02-79CS30120	**AIA Research Corp., Washington, DC**	
	8:43619	CONF-800972—(1980).
AC02-79CS30156	**Iowa Energy Policy Council, Des Moines**	
	8:43586	CONF-800972—(1980).
AC02-79CS30166	**Steven Winter Associates, Inc., New York, NY**	
	8:43636	CONF-800972—(1980).
AC02-79CS30238	**Georgia Inst. of Tech., Atlanta**	
	8:43569	CONF-800972—(1980).
AC02-79CS30241	**Univ. of Pennsylvania, Philadelphia**	
	8:43620	CONF-800972—(1980).
AC02-79CS30242	**Univ. of South Dakota, Vermillion**	
	8:43573	CONF-800972—(1980).
AC02-79ER10362	**Columbia Univ., New York (USA). Dept. of Chemistry**	
	8:44348	DOE/ER/10362—T2
AC02-79ER10390	**Department of Materials Science and Engineering, Northwestern University, Evanston, Illinois 60201**	
	8:44290	Journal of Applied Physics 54 NO. 7. 4205-4208 (Jul 1983).

Contract No.	Abstract No.	Report No.
AC02-79ER10444	**Department of Physics, Boston University, Boston, Massachusetts, 02215**	
	8:44300	Journal of Applied Physics 54 NO. 6. 3623-3625 (Jun 1983).
AC02-79ER10457	**Carnegie-Mellon Univ., Pittsburgh, PA (USA). Dept. of Chemistry**	
	8:44356	DOE/ER/10457—4
AC02-79ER10470	**Harvard Univ., Cambridge, MA**	
	8:44341	Journal of Physical Chemistry 87 NO. 2. 289-293 (20 Jan 1983).
AC02-79ET23168	**Mich. State Univ., E. Lansing, MI**	
	8:43722	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Power Apparatus a
AC02-80CS30254	**Univ. of Texas, Austin**	
	8:43574	CONF-800972—(1980).
AC02-80CS30260	**Univ. of California, San Diego, La Jolla**	
	8:43567	CONF-800972—(1980).
AC02-80ER10603	**Nebraska Univ., Lincoln (USA). Dept. of Chemistry**	
	8:44349	DOE/ER/10603—T2
AC02-80ER10645		
	8:44373	
AC02-80ER10677	**Department of Nuclear Engineering and Physics, Kansas State University, Manhattan, Kansas 66506**	
	8:44909	Physical Review Letters 50 NO. 15. 1125-1128 (11 Apr 1983).
AC02-80ER10750	**State Univ. of New York, Stony Brook (USA). Research Foundation**	
	8:45063	DOE/ER/10750—T1
AC02-80ER10759	**State Univ. of New York, Stony Brook (USA)**	
	8:44514	DOE/ER/10759—3
AC02-80ER10766	**Arvin Calspan, Buffalo, NY (USA). Applied Technology Group**	
	8:44726	DOE/ER/10766—T2
AC02-80ER53104	**Nuclear Engineering Department, University of Wisconsin-Madison, Madison, Wisconsin 53706**	
	8:45177	Physics of Fluids 26 NO. 6. 1526-1527 (Jun 1983).
AC02-80ET34031	**General Electric Co., San Jose, CA (USA). Nuclear Engineering Div.**	
	8:43745	DOE/ET/34031—13
AC02-80RA50156	**Cable Technology Labs., Inc., New Brunswick, NJ (USA)**	
	8:44451	DOE/RA/50156—T1
AC02-81CS22804	**Lane and Edson, P.C., Washington, DC (USA)**	
	8:44074	DOE/CS/22804—2
AC02-81ER10941	**Department of Metallurgical Engineering, Michigan Technological University, Houghton, Michigan 49931**	
	8:44395	Review of Scientific Instruments 54 NO. 6. 773-774 (Jun 1983).
AC02-81ER10960	**Northwestern Univ., Evanston, IL (USA)**	
	8:44132	DOE/ER/10960—3
AC02-81ER10969	**Department of Mechanical Engineering and Center for Laser Diagnostics, Yale University, New Haven, C**	
	8:44369	Optics Letters 8 NO. 5. 244-246 (May 1983).
AC02-81ER40007	**Indiana University Cyclotron Facility and Department of Chemistry, Indiana University, Bloomington,**	
	8:44989	Physical Review Letters 50 NO. 21. 1648-1651 (23 May 1983).
AC02-81ER60000	**Columbia Univ., Palisades, NY (USA). Lamont-Doherty Geological Observatory**	
	8:44742	DOE/ER/60000—T1
AC02-81ER60029	**Hahnemann Medical Coll. and Hospital, Philadelphia, PA (USA)**	
	8:44766	DOE/ER/60029—2
AC02-81EV10673	**Yale Univ., New Haven, CT (USA)**	
	8:44567	DOE/EV/10673—T1
	8:44568	DOE/EV/10673—T2
AC02-82ER12049	**Indiana University, Bloomington, Indiana 47405**	
	8:44910	Physical Review Letters 50 NO. 14. 1031-1034 (4 Apr 1983).
AC02-82ER53140	**Grumman Aerospace Corp., Princeton, NJ (USA)**	
	8:45099	DOE/ER/53140—9
AC02-82ER60063	**Tracer Technologies, Inc., Newton, MA (USA)**	
	8:44324	DOE/ER/60063—1
AC03-76CS51294	**General Electric Co., Schenectady, NY (USA)**	
	8:44124	DOE/CS/51294—01
	8:44125	DOE/CS/51294—01-Annex-A
AC03-76ET53057	**Plasma Research Institute, Science Applications, Inc., Boulder, Colorado 80302**	
	8:45159	Physics of Fluids 26 NO. 7. 1836-1845 (Jul 1983).
	8:45160	Physics of Fluids 26 NO. 7. 1846-1850 (Jul 1983).
	8:45162	Physics of Fluids 26 NO. 7. 1866-1870 (Jul 1983).
AC03-76SF00098	**Lawrence Berkeley Lab., CA (USA)**	
	8:43269	LBL—15227
	Waterloo Univ., Ontario (Canada). Dept. of Earth Sciences	
	8:43360	LBL—11829
	Lawrence Berkeley Lab., CA (USA)	
	8:43361	LBL—12469
	8:43362	LBL—12574
	8:43363	LBL—14202
	8:43438	PNL-SA—11306(May 1983).
	8:43501	LBL—16131
	8:43656	LBL—15526
	8:44081	LBL—14914-Rev.
	8:44082	LBL—15305
	Gershman, Brickner and Bratton, Inc., Washington, DC (USA)	
	8:44108	DOE/BP—143
	Lawrence Berkeley Lab., CA (USA)	
	8:44281	LBL—14938
	8:44282	LBL—16190
	8:44283	LBL—16272
	8:44299	Journal of Applied Physics 54 NO. 6. 3479-3484 (Jun 1983).
	8:44306	Physical Review Letters 50 NO. 14. 1092-1094 (4 Apr 1983).
	8:44339	Journal of the American Chemical Society 105 NO. 2. 304-305 (26 Jan 1983).
	8:44353	Journal of Physical Chemistry 87 NO. 2. 203-213 (20 Jan 1983).
	8:44357	Journal of Physical Chemistry 87 NO. 2. 265-271 (20 Jan 1983).
	8:44370	Journal of Heat Transfer 105 NO. 1. 159-165 (Feb 1983).
	8:44398	Journal of Low Temperature Physics 51 NO. 1. 207-224 (1 Apr 1983).
	8:44405	Optics Letters 8 NO. 5. 277-279 (May 1983).
	8:44553	LBL—16171
	8:44619	LBL—15381
	8:44620	LBL—15676
	8:44744	LBL—16152
	8:44817	LBL—11654
	8:44818	LBL—12520
	8:44880	LBL—16241

Contract No.	Abstract No.	Report No.
	8:44889	Review of Scientific Instruments 54 NO. 6. 677-680 (Jun 1983).
	8:44931	LBL—16135
	8:44932	LBL—16197
	8:45084	Applied Optics 22 NO. 9. 1265-1267 (1 May 1983).
	8:45304	LBL—16042
AC03-76SF00515	**Stanford Linear Accelerator Center, CA (USA)**	
	8:44479	SLAC/AP—5
	8:44501	PEP-NOTE—373
	8:44502	PEP-NOTE—374
	8:44503	PEP-NOTE—375
	8:44504	PEP-NOTE—377
	8:44505	PEP-NOTE—378
	8:44506	SLAC/AP—1
	8:44507	SLAC/AP—2
	8:44515	DOE/SF/00515—T10
	8:44516	DOE/SF/00515—T11
	8:44517	DOE/SF/00515—T12
	8:44518	DOE/SF/00515—T13
	8:44519	DOE/SF/00515—T15
	8:44520	DOE/SF/00515—T16
	8:44554	SLAC/AP—3
	8:44556	
	8:44560	PEP-NOTE—372
	8:44939	Physical Review [Section] D: Particles and Fields 27 NO. 8. 1878-1893 (15 Apr 1983).
	8:45060	SLAC-PUB—3153
AC03-77ET20299	**Lockheed Missiles and Space Co., Sunnyvale, CA (USA). Ocean Systems Div.**	
	8:43543	SAN—1568-78/4(Vol.2)
AC03-77SF90506	**Sanders Associates, Inc., Nashua, NH (USA). Energy Systems Center**	
	8:43535	DOE/SF/90506—1
AC03-79CS30201	**Trinity Univ., San Antonio, TX**	
	8:43618	CONF-800972—(1980).
AC03-79ET15426	**Northern Research and Engineering Corp., Woburn, MA (USA)**	
	8:44464	DOE/ET/15426—T25
AC03-80CS30211	**Planning and Management Associates of Greater Washington, Inc., DC (USA)**	
	8:43548	CONF-800972—
	8:43638	DOE/CS/30211—01
AC03-80ET34034	**General Electric Co., Sunnyvale, CA (USA). Advanced Reactor Systems Dept.**	
	8:43833	GEFR—00622
AC03-81SF11549	**Pacific Energy Technology, Inc., Sausalito, CA (USA)**	
	8:44051	DOE/SF/11549—T1
AC04-76DP00613	**Bendix Corp., Kansas City, MO (USA)**	
	8:44371	BDX—613-2957
	8:44450	BDX—613-2920
AC04-76DP00789	**Colorado State Univ., Fort Collins (USA). Dept. of Physics**	
	8:43277	SAND—83-7100
	Sandia National Labs., Albuquerque, NM (USA)	
	8:43296	SAND—83-0964
	8:43305	SAND—83-0794
	8:43334	SAND—82-1937C
	8:43335	SAND—82-1951C
	8:43336	SAND—82-1952C
	8:43380	SAND—80-0202
	8:43381	SAND—81-1405C
	8:43382	SAND—81-7206
	8:43383	SAND—82-0525
	8:43384	SAND—82-2980
	8:43385	SAND—83-0166
	8:43386	SAND—83-0280
	8:43665	SAND—83-0278
	8:43709	EPRI-AP—2884-SR(Feb 1983).
	8:43721	SAND—82-2115
	8:43742	Journal of Applied Physics 54 NO. 6. 3534-3543 (Jun 1983).

Contract No.	Abstract No.	Report No.
	Science Applications, Inc., Bethesda, MD (USA)	
	8:43757	NUREG/CR—3085-Vol.3
	Sandia National Labs., Albuquerque, NM (USA)	
	8:43938	NUREG/CR—2843/3
	8:43950	SAND—83-0443C
	8:43951	SAND—83-1192
	8:44195	SAND—83-0772C
	8:44196	SAND—83-0801C
	8:44197	SAND—83-1608C
	8:44207	Journal of Applied Physics 54 NO. 6. 3172-3175 (Jun 1983).
	8:44212	Physical Review [Section] B: Condensed Matter 27 NO. 10. 6475-6477 (15 May 1983).
	8:44284	SAND—83-0697C
	8:44285	SAND—83-1300C
	8:44295	Journal of Applied Physics 54 NO. 6. 3160-3165 (Jun 1983).
	8:44351	SAND—83-0536C
	8:44393	SAND—83-1601C
	8:44439	Journal of Heat Transfer 105 NO. 1. 144-150 (Feb 1983).
	8:44453	SAND—83-0414
	8:44626	SAND—83-0479C
	8:44627	SAND—83-0653C
	8:44628	SAND—83-1433C
	8:44641	SAND—82-1730
	8:44642	SAND—82-2280
	8:44643	SAND—83-1058
	8:44814	SAND—83-0672C
	8:45066	SAND—83-0537C
	8:45072	Journal of Applied Physics 54 NO. 6. 3154-3159 (Jun 1983).
	8:45075	Physical Review [Section] B: Condensed Matter 27 NO. 8. 4788-4798 (15 Apr 1983).
	8:45271	Physics of Fluids 26 NO. 6. 1670-1677 (Jun 1983).
	8:45272	Review of Scientific Instruments 54 NO. 6. 665-672 (Jun 1983).
	8:45310	SAND—83-1110
	8:45311	SAND—83-1119
	Sandia National Labs., Livermore, CA (USA)	
	8:45312	SAND—83-8231
AC04-76DP03533	**Rockwell International Corp., Golden, CO (USA). Rocky Flats Plant**	
	8:43326	RFP-ABST—09(Jul 1983).
	8:43377	RFP—3357
	8:44746	RFP-Trans—406(Jul 1983).
AC04-76EV01013	**Lovelace Biomedical and Environmental Research Inst., Albuquerque, NM (USA)**	
	8:44695	LF-tr—127(1980).
AC04-79CS30173	**Communico, Inc., Santa Fe, NM**	
	8:43624	CONF-800972—(1980).
AC04-80ET20624	**Arizona Public Service Co., Phoenix (USA)**	
	8:43529	DOE/ET/20624—T4
AC05-76OR00033	**Northwestern Univ., Evanston, IL (USA). Mineral Resources Engineering and Management Program**	
	8:43250	DOE/OR/00033—T6
	Oak Ridge Associated Universities, Inc., TN (USA)	
	8:43825	ORAU/IEA—83-5(M)
	8:43947	ORAU/IEA—83-7(M)
	8:45287	DOE/OR/00033—T25
AC05-76OR01156		
	8:43327	
	8:43328	
	NLO, Inc., Cincinnati, OH (USA)	
	8:43407	NLCO—1192
AC05-82ER53131	**Austin Research Associates, Inc., TX (USA)**	
	8:45098	DOE/ER/53131—4

Contract No.	Abstract No.	Report No.
AC06-76FF02170	**Hanford Engineering Development Lab., Richland, WA (USA)**	
	8:44139	HEDL-TME—83-17
AC06-76RL01830	**Pacific Northwest Lab., Richland, WA (USA)**	
	8:43193	PNL-SA—10508
	8:43252	PNL-SA—9661
	Northwestern Univ., Evanston, IL (USA). Dept. of Civil Engineering	
	8:43254	PNL-SA—9720
	Pacific Northwest Lab., Richland, WA (USA)	
	8:43255	PNL-SA—9981
	8:43333	PNL-SA—9872
	8:43346	DOE/UMT—0064
	8:43366	NUREG/CR—2938
	Westinghouse Electric Corp., Pittsburgh, PA (USA)	
	8:43367	ONWI—242
	Battelle Memorial Inst., Columbus, OH (USA). Office of Nuclear Waste Isolation	
	8:43368	ONWI—390
	8:43369	ONWI—391
	8:43370	ONWI—392
	Louisiana State Univ., Baton Rouge (USA). Inst. for Environmental Studies	
	8:43371	ONWI—467-Vol.1
	8:43372	ONWI—467-Vol.2
	ERTEC, Inc., Long Beach, CA (USA)	
	8:43373	ONWI—481
	Pacific Northwest Lab., Richland, WA (USA)	
	8:43375	PNL—4488
	8:43376	PNL-SA—7279
	8:43396	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science 3
	8:43425	PNL-SA—11306
	8:43528	
	8:43719	PNL-SA—9566
	8:43756	NUREG/CR—2884
	8:43787	PNL-SA—10818
	8:43813	PNL-SA—9928
	8:43937	NUREG/CR—2599
	Battelle Human Affairs Research Center, Seattle, WA (USA)	
	8:43940	NUREG/CR—3175
	Los Alamos National Lab., NM (USA)	
	8:43942	NUREG/CR—3278
	Pacific Northwest Lab., Richland, WA (USA)	
	8:43948	PNL-SA—9729
	8:43949	PNL-SA—9992
	8:43973	PNL-SA—10738
	8:43974	PNL-SA—11145
	8:43989	PNL-SA—10893
	Law Engineering Testing Co., Atlanta, GA (USA)	
	8:44008	ONWI—169
	Pacific Northwest Lab., Richland, WA (USA)	
	8:44085	PNL—4725
	Centaur Associates, Inc., Washington, DC (USA)	
	8:44086	PNL—4764
	Little (Arthur D.), Inc., Cambridge, MA (USA)	
	8:44102	PNL—4734
	8:44103	PNL—4770
	Pacific Northwest Lab., Richland, WA (USA)	
	8:44194	PNL-SA—9157
	8:44431	PNL-SA—9501
	8:44432	PNL-SA—9530
	8:44657	Journal of the Atmospheric Sciences 40 NO. 3. 708-717 (Mar 1983).
	8:44687	PNL-SA—9575
	8:44717	PNL-SA—9709
	8:44718	PNL-SA—11299
	8:44748	PNL—4659
	8:44759	PNL-SA—9916
	8:44776	PNL-SA—9668
	8:44786	PNL-SA—9839
	Ertec Western, Inc., Long Beach, CA (USA)	
	8:44813	ONWI—480
	Pacific Northwest Lab., Richland, WA (USA)	
	8:44819	PNL-SA—10750
	8:45059	NUREG/CR—2957
	8:45306	PNL-SA—9619
	8:45307	PNL-SA—10092
	8:45308	PNL-SA—10433
AC06-76RL01857	**UNC Nuclear Industries, Inc., Richland, WA (USA)**	
	8:43788	UNI-SA—114
AC06-77RL01030	**Rockwell International Corp., Richland, WA (USA). Rockwell Hanford Operations**	
	8:43378	RHO-BW-SA—271P
	8:43379	RHO-BWI-LD—29
AC06-80ER53096	**Mathematical Sciences Northwest Inc., Bellevue, Washington 98004**	
	8:45185	Physics of Fluids 26 NO. 6. 1626-1629 (Jun 1983).
AC07-76ID01570	**Colorado School of Mines, Golden (USA). Research Inst.**	
	8:43350	EGG—2262
	EG and G Idaho, Inc., Idaho Falls (USA)	
	8:43351	EGG-M—01683
	Idaho National Engineering Lab., Idaho Falls (USA)	
	8:43352	EGG-M—11783
	EG and G Idaho, Inc., Idaho Falls (USA)	
	8:43353	EGG-M—11883
	8:43354	EGG-WM-F—1-83-018
	8:43355	IDO—10086(82)
	8:43561	CONF-800972—(1980).
	8:43662	EGG—2208
	8:43744	EGG-M—02683
	8:43747	EGG-M—09883
	8:43748	EGG-M—28682
	8:43820	EGG—M-11983
	8:43869	EGG-M—17282
	8:43870	EGG-M—30982
	8:43873	NUREG/CR—3289
	8:43886	EGG-M—08983
	8:43900	EGG-M—01183
	8:43901	EGG-M—01883
	8:43902	EGG-M—02283
	8:43903	EGG-M—09783
	8:43904	EGG-M—14682
	8:43905	EGG-M—14882
	8:43906	EGG-M—20082
	8:43907	EGG-M—26182
	8:43910	GEND-INF—11-Vol.3
	Sundstrand Corp., Rockford, IL (USA). Sundstrand Energy Systems	
	8:44097	EGG—2265
	EG and G Idaho, Inc., Idaho Falls (USA)	
	8:44136	EGG-M—09983
	8:44707	IDO—10057(82)
	8:45215	EGG-M—11183
	8:45290	EGG-M—06483
AC08-80DP40124	**Rochester Univ., NY (USA). Coll. of Engineering and Applied Science**	
	8:45212	DOE/DP/40124—6
	8:45270	Journal of Applied Physics 54 NO. 7. 3662-3671 (Jul 1983).
AC08-81NV10162	**Nevada Univ., Reno (USA). Desert Research Inst.**	
	8:43343	DOE/NV/10162—7
	Nevada Univ., Reno (USA). Water Resources Center	
	8:44711	DOE/NV/10162—5
	Nevada Univ., Las Vegas (USA). Desert Research Inst.	
	8:44712	DOE/NV/10162—9
	8:44720	DOE/NV/10162—4

Contract No.	Abstract No.	Report No.
	Nevada Univ., Reno (USA). Desert Research Inst.	
	8:44721	DOE/NV/10162—8
AC08-82DP40152	KMS Fusion, Inc., Ann Arbor, MI (USA)	
	8:45214	DOE/DP/40152—T1
AC08-83DP40178	Stanford Univ., CA (USA). Edward L. Ginzton Lab.	
	8:44631	CONF-830666—3
AC09-76SR00001	Bechtel National, Inc., San Francisco, CA (USA)	
	8:43349	DPSPU—83-30-4-Rev.
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Lab.	
	8:44569	DP-MS—83-7
	Du Pont de Nemours (E.I.) and Co., Aiken, SC (USA). Savannah River Plant	
	8:44789	DPSPU—83-30-3
AC11-76PN00292	USDOE Pittsburgh Naval Reactors Office, West Mifflin, PA	
	8:43764	DLCS—5000183
AC13-76GJ01664	High Life Helicopters, Inc., Puyallup, WA (USA)	
	8:43312	DOE/GJ/01664—T4
	Bendix Field Engineering Corp., Grand Junction, CO (USA)	
	8:43313	GJBX—17(83)
	Bendix Field Engineering Corp., Grand Junction, CO (USA). Grand Junction Operations	
	8:43325	GJBX—30(83)
AC13-79GJ01692	High Life Helicopters, Inc., Puyallup, WA (USA)	
	8:43314	GJBX—31-83-Vol.1
	8:43315	GJBX—31-83-Vol.2B-DD
	8:43316	GJBX—31-83-Vol.2B-DB
	8:43317	GJBX—31-83-Vol.2C-DA
	8:43318	GJBX—31-83-Vol.2B-DC
	8:43319	GJBX—31-83-Vol.2A-DA
	8:43320	GJBX—31-83-Vol.2A-DC
	8:43321	GJBX—31-83-Vol.2C-DB
	8:43322	GJBX—31-83-Vol.2A-DD
	8:43323	GJBX—31-83-Vol.2A-DB
	8:43324	GJBX—31-83-Vol.2B-DA
AC18-80FC10182	Meteorology Research, Inc., Altadena, CA (USA)	
	8:43213	DOE/FC/10182—T15
AC19-79BC10116	Minnesota Univ., Minneapolis (USA). Dept. of Chemical Engineering and Materials Science	
	8:43270	DOE/BC/10116—20
AC19-79MC08383	Gulf Oil Exploration and Production Co., Oklahoma City, OK (USA)	
	8:43271	DOE/MC/08383—45-Vol.1
	8:43272	DOE/MC/08383—45-Vol.2
AC20-76LC10153	Dow Chemical Co., Midland, MI (USA). Hydrocarbons and Energy Research Dept.	
	8:43304	FE—2346-8
AC21-76ET10417	Curtiss-Wright Corp., Wood-Ridge, NJ (USA). Power Systems Div.	
	8:44461	CW-WR—76-015.49A
AC21-77ET10373	Combustion Power Co., Inc., Menlo Park, CA (USA)	
	8:43212	DOE/ET/10373—T10
AC21-77ET10415	Minnick (L. John), Plymouth Meeting, PA (USA)	
	8:44096	DOE/ET/10415—T6
AC21-79MC10734	Mountain Fuel Supply Co., Salt Lake City, UT (USA)	
	8:43249	DOE/MC/10737—1436
AC21-79MC10865	New Mexico State Univ., Las Cruces (USA)	
	8:43273	DOE/MC/10865—13
AC21-80ET14928	General Electric Co., Schenectady, NY (USA). Corporate Research and Development Center	
	8:43165	DOE/ET/14928—1437
	8:43166	DOE/ET/14928—1438
AC21-80MC14273	Mechanical Technology, Inc., Latham, NY (USA)	
	8:43169	DOE/MC/14273—1411
AC21-80MC14373	Laguna Research Lab., Laguna Beach, CA (USA)	
	8:44664	DOE/MC/14373—T1
AC21-80MC14593	SRI International, Menlo Park, CA (USA)	
	8:43170	DOE/MC/14593—1416
AC21-80MC14705	Institute of Gas Technology, Chicago, IL (USA)	
	8:43171	DOE/MC/14705—1429
	8:43172	DOE/MC/14705—1430
AC21-81FE05147	McKee (Davy) Corp., Cleveland, OH (USA)	
	8:43167	DOE/FE/05147—T16
	8:43168	DOE/FE/05147—T17
AC21-81MC16049	Flow Industries, Inc., Kent, WA (USA)	
	8:43216	DOE/MC/16049—T7
AC21-81MC16221	United Technologies Research Center, East Hartford, CT (USA)	
	8:43191	DOE/MC/16221—T2
AC21-81MC16441	Research Triangle Inst., Research Triangle Park, NC (USA)	
	8:43217	DOE/MC/16441—1423
AC21-81MC16547	Radian Corp., McLean, VA (USA)	
	8:43218	DOE/MC/16547—1420
AC21-82MC19028	Aerodyne Research, Inc., Billerica, MA (USA). Center for Chemical and Environmental Physics	
	8:44659	ARI-RP—150
AC21-82MC19239	Lewin and Associates, Inc., Washington, DC (USA)	
	8:43295	DOE/MC/19239—1422
AC21-82MC19403	Institute of Gas Technology, Chicago, IL (USA)	
	8:43173	DOE/MC/19403—2
AC22-80PC30022	Mobil Research and Development Corp., Paulsboro, NJ (USA)	
	8:43423	DOE/PC/30022—2
AC22-81PC40273	TRW Defense and Space Systems Group, Redondo Beach, CA (USA). Fluid Thermochemistry Dept.	
	8:43161	CSS/CI—83-06
AI01-76PR06010	National Bureau of Standards, Washington, DC (USA)	
	8:45103	DOE/PR/06010—T32
AI01-77CS51040	Martini Engineering, Richland, WA (USA)	
	8:44123	DOE/NASA/3194—1
AI01-77CS51044	National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center	
	8:44126	DOE/NASA/51044—30
AI01-77ET13111	Gulf Research and Development Co., Pittsburgh, PA (USA)	
	8:43174	DOE/NASA/0175—1-Vol.1
	8:43175	DOE/NASA/0175—1-Vol.2
	8:43176	DOE/NASA/0175—1-Vol.3
	8:43177	DOE/NASA/0175—1-Vol.4
AI01-79CS40240	INVECO, Inc., Huntington Beach, CA (USA)	
	8:44076	DOE/CS/40240—T1
AI01-79CS40293	Valley Forge Labs., Devon, PA (USA)	
	8:44100	FHWA/RD—82/167
AI01-80ET17088	United Technologies Corp., South Windsor, CT (USA). Power Systems Div.	
	8:44056	DOE/NASA/0210—1
AI01-81CS50006	Southwest Research Inst., San Antonio, TX (USA)	
	8:44127	DOE/NASA/0287—1
AI04-80AL12726	National Aeronautics and Space Administration, Cleveland, OH (USA). Lewis Research Center	
	8:44057	DOE/NASA/12726—20
AI08-76DP00539	Environmental Protection Agency, Las Vegas, NV (USA). Environmental Monitoring Systems Lab.	
	8:44696	DOE/DP/00539—049

Contract No.	Abstract No.	Report No.
AI08-81DP40133	Rochester Univ., NY (USA). Lab. for Laser Energetics	
	8:45213	DOE/DP/40133—1
AM03-76SF00034	Department of Physics, University of California, Los Angeles, California 90024	
	8:44903	Annals of Physics (New York) 146 NO. 1. 78-128 (Mar 1983).
AM06-76RL02230	Department of Physics, Faculty of Mathematics and Sciences, University of Indonesia, Jakarta, Indone	
	8:44970	Physical Review [Section] C: Nuclear Physics 27 NO. 5. 2173-2191 (May 1983).
AS03-78CS31606	New Mexico State Univ., Las Cruces	
	8:43616	CONF-800972—(1980).
AS05-76EV04568	Tennessee Univ., Oak Ridge (USA). Graduate School of Biomedical Sciences	
	8:44788	DOE/EV/04568—35
AS05-78ER06034	North Carolina Univ., Chapel Hill (USA). Dept. of Chemistry	
	8:44334	DOE/ER/06034—T7
AS05-78ER06036	Texas A and M Univ., College Station (USA). Cyclotron Inst.	
	8:44838	DOE/ER/06036—T1
AS05-78ET52025	Georgia Inst. of Tech., Atlanta (USA). School of Nuclear Engineering and Health Physics	
	8:45218	GTFR—37
	8:45219	GTFR—40
AS05-79ER10489	Tennessee Technological Univ., Cookeville	
	8:44330	Analytical Chemistry 54 2636-2637 (1982).
AS05-80ER10641	North Carolina Univ., Chapel Hill (USA). Dept. of Chemistry	
	8:44350	DOE/ER/10641—1
AS05-81ER10947	Center for Studies in Statistical Mechanics, University of Texas at Austin, Austin, Texas 78712	
	8:45087	Physical Review Letters 50 NO. 14. 1023-1026 (4 Apr 1983).
AS05-81ER40032	T. W. Bonner Nuclear Laboratory, Rice University, Houston, Texas 77251	
	8:44934	Physical Review [Section] D: Particles and Fields 27 NO. 11. 2678-2685 (1 Jun 1983).
AS05-82NE37900	Auburn Univ., AL (USA). Dept. of Mechanical Engineering	
	8:43801	DOE/NE/37900—1
	8:43802	DOE/NE/37900—3
	8:44135	DOE/NE/37900—2
AS07-78ID01756	New Mexico State Univ., Las Cruces (USA). New Mexico Energy Inst.	
	8:43660	DOE/ID/01756—2
	8:43661	NMEI—61-26
AS08-81DP40151	Laboratory for Plasma and Fusion Energy Studies, University of Maryland, College Park, Maryland 2074	
	8:45166	Physics of Fluids 26 NO. 7. 1904-1908 (Jul 1983).
AS09-76SR00952	New Mexico Univ., Albuquerque (USA)	
	8:43309	DOE/SR/00952—T4
	Florida Univ., Gainesville (USA)	
	8:43329	DOE/SR/00952—T2
	Kansas State Univ., Manhattan (USA)	
	8:43330	DOE/SR/00952—T3
	Ohio State Univ., Columbus (USA)	
	8:43345	DOE/SR/00952—T7
	International Atomic Energy Agency, Vienna (Austria)	
	8:43394	DOE/SR/00952—T9
	New Mexico Univ., Albuquerque (USA)	
	8:43401	DOE/SR/00952—T6
	Ohio State Univ., Columbus (USA)	
	8:43402	DOE/SR/00952—T8
	Cincinnati Univ., OH (USA)	
	8:43746	DOE/SR/00952—T1
	Kansas State Univ., Manhattan (USA)	
	8:43829	DOE/SR/00952—T5
	Arizona Univ., Tucson (USA)	
	8:43830	DOE/SR/00952—T10
AT03-76ER70227	Institute for Pure and Physical Sciences, University of California, San Diego, La Jolla, California	
	8:44249	Journal of Low Temperature Physics 51 NO. 1. 117-134 (1 Apr 1983).
AT03-76ER70259	California Univ., Los Angeles (USA). School of Engineering and Applied Science	
	8:43511	UCLA-ENG—83-21
AT03-76ER70294	California Univ., Los Angeles (USA). School of Engineering and Applied Science	
	8:44133	DOE/ER/70294—T1
AT03-76ER72018	Stanford Univ., CA (USA). Dept. of Operations Research	
	8:45313	SOL—83-5
AT03-76ET51011	General Atomic Company, San Diego, California 92138	
	8:45175	Physics of Fluids 26 NO. 6. 1508-1515 (Jun 1983).
	8:45179	Physics of Fluids 26 NO. 6. 1542-1544 (Jun 1983).
AT03-76SF70046	GA Technologies, Inc., San Diego, CA (USA)	
	8:43909	GA-A—17000
AT03-81NE33080	University of Southern California, Los Angeles (USA). Center for Laser Studies	
	8:44263	DOE/NE/33080—T1
AT03-82SF11690	GA Technologies, Inc., San Diego, CA (USA)	
	8:43819	GA—A16992
AT06-76ER71001	Montana Univ., Missoula (USA)	
	8:44974	DOE/ER/71001—T1
FC01-80ER10653	Battelle Columbus Labs., OH (USA)	
	8:43451	DOE/ER/10653—T1
FC02-80CS30321	Dept. of Transportation and Public Facilities, Fairbanks, AK	
	8:43591	CONF-800972—(1980).
FC02-80CS30323		
	8:43592	
FC02-80CS30326	Carnegie-Mellon Univ., Pittsburgh, PA	
	8:43595	CONF-800972—(1980).
FC02-80CS30329	Edward Mazria and Associates, Albuquerque, NM	
	8:43603	CONF-800972—(1980).
FC02-80CS30331	Colorado Mountain Coll., Glenwood Springs	
	8:43597	CONF-800972—(1980).
FC02-80CS30338	Girl Scouts of Greater Philadelphia, PA	
	8:43598	CONF-800972—(1980).
FC02-80CS30343	North Design, Middleton, WI	
	8:43604	CONF-800972—(1980).
FC02-80CS30345	Mennonite Nursing Home, Albany, OR	
	8:43602	CONF-800972—(1980).
FC02-80CS30348	Princeton Professional Park Partnership, NJ	
	8:43606	CONF-800972—(1980).
FC02-80CS30351	Rocks and Trees, Inc., Middletown Springs, VT	
	8:43607	CONF-800972—(1980).
FC02-80CS30353	John Weidt Associates, Inc., Chaska, MN	
	8:43608	CONF-800972—(1980).
FC02-80CS30357	Syracuse Research Corp., NY	
	8:44064	CONF-800972—(1980).
FC02-80CS30361	Willow Park II Community Improvement Association, Missouri City, TX	
	8:43611	CONF-800972—(1980).
FC02-80CS30362	St. Mary's School, Alexandria, VA	
	8:44062	CONF-800972—(1980).
FC02-80CS30363	Acorn Structures, Inc., Concord, MA	
	8:43559	CONF-800972—(1980).
FC02-80CS30367	Butler Manufacturing Co., Brandview, MO	
	8:43594	CONF-800972—(1980).

Contract No.	Abstract No.	Report No.
FC02-80CS30374	Gulf States Manufacturers, Inc., Starkville, MS	
	8:43599	CONF-800972—(1980).
FC02-80CS30375	Madison Industries Inc. of Georgia, Conyers	
	8:43562	CONF-800972—(1980).
FC02-80CS30378	Northern Homes of Pennsylvania, Inc., Chambersburg	
	8:43565	CONF-800972—(1980).
FC02-80CS30385	Usry Inc., Richmond, VA	
	8:43566	CONF-800972—(1980).
FC02-80CS30388	Poligon, Holland, MI	
	8:43605	CONF-800972—(1980).
FC02-80CS30389	W. H. Porter, Inc., Holland, MI	
	8:43632	CONF-800972—(1980).
FC02-80CS30532	Star Technology Corp., Carbondale, CO	
	8:44066	CONF-800972—(1980).
FC07-79RA23214	Salt River Project, Phoenix, AZ (USA)	
	8:43476	DOE/RA/23214—1
FC07-79RA23215	Turlock Irrigation District, CA (USA)	
	8:43475	DOE/RA—23215
FG01-78ET20597	Virginia Polytechnic Inst. and State Univ., Blacksburg (USA). Dept. of Forestry	
	8:43493	DOE/ET/20597—T11
FG01-80CS15013	Oregon State Univ., Corvallis (USA). Clark Meat Science Lab.	
	8:44095	DOE/CS/15013—T1
FG01-80CS24416	New England Innovation Group, Providence, RI (USA)	
	8:44109	DOE/CS/24416—T1
	8:44110	DOE/CS/24416—T2
FG01-80IR10321	Chillcast, Inc., Marion, OH (USA)	
	8:44134	DOE/IR/10321—T1
FG01-81FE05110	Carlson and Sweatt - Monenco, Inc., New York (USA)	
	8:43246	NYSERDA—82-25-Vol.2
FG02-77CS34139	Dartmouth Coll., Hanover, NH	
	8:43581	CONF-800972—(1980).
FG02-77CS34153	Living Systems, Winters, CA	
	8:43614	CONF-800972—(1980).
FG02-79CS30169	Davis Alternative Tech. Associates, CA	
	8:43582	CONF-800972—(1980).
FG02-79CS30244	Energy Engineering Group, Inc., Golden, CO	
	8:43568	CONF-800972—(1980).
FG02-79CS30300	NAHB Research Foundation, Inc., Rockville, MD	
	8:43563	CONF-800972—(1980).
FG02-81R510299	Hammond, City of, IN (USA). Planning and Development Dept.	
	8:44113	DOE/R5/10299—T2
	8:44114	DOE/R5/10299—T3
FG02-81R510325	Dynamic Plastics, Inc., New Paris, OH (USA)	
	8:43639	DOE/R5/10325—T1
	Miami Univ., Oxford, OH (USA). Dept. of Architecture	
	8:43640	DOE/R5/10325—T2
FG02-82FE60173	Bismarck Junior Coll., ND (USA)	
	8:43283	DOE/FE/60173—T1
FG03-77CS31842	Skytherm Processes and Engineering, Los Angeles, CA	
	8:43617	CONF-800972—(1980).
FG04-77CS34146	Architectural Alliance, Minneapolis, MN	
	8:43580	CONF-800972—(1980).
FG05-80ET53088	Texas Univ., Austin (USA). Inst. for Fusion Studies	
	8:45102	DOE/ET/53088—96
	8:45157	Physics of Fluids 26 NO. 7. 1825-1829 (Jul 1983).
	8:45172	Physics of Fluids 26 NO. 6. 1385-1388 (Jun 1983).
	8:45174	Physics of Fluids 26 NO. 6. 1461-1466 (Jun 1983).
NAS-7-100-954874		
	8:43512	
NAS-7-100-955567	Spectrolab, Inc., Sylmar, CA (USA)	
	8:43494	DOE/JPL/955567—83-11
NAS-7-100-955909	Westinghouse Electric Corp., Pittsburgh, PA (USA). Advanced Energy Systems Div.	
	8:43495	DOE/JPL/955909—83/10
NAS-7-100-956205	Spectrolab, Inc., Sylmar, CA (USA)	
	8:43496	DOE/JPL/956205—83/4
W-31-109-ENG-38	Argonne National Lab., IL (USA)	
	8:43293	CONF-8211101—1
	8:43303	CONF-830439—11
	8:43393	CONF-830375—1
	8:43541	ANL/EES-TM—224
	Energotechnology Corp., Cambridge, MA (USA)	
	8:43725	CONF-830446—5
	Argonne National Lab., IL (USA)	
	8:43797	ANL—83-3
	8:43798	ANL—83-43
	8:43799	ANL—83-56
	8:43817	ZPR-TM—444
	United Engineers and Constructors, Inc., Philadelphia, PA (USA)	
	8:43827	DOE/NE—0051
	8:43828	DOE/NE—0052
	Argonne National Lab., IL (USA)	
	8:43899	CONF-820662—6
	8:43945	NUREG/CR—3359-Vol.1
	8:43986	CONF-830566—4
	George Mason Univ., Fairfax, VA (USA). Dept. of Economics	
	8:43987	CONF-830672—1
	Argonne National Lab., IL (USA)	
	8:44049	CONF-830583—3
	8:44088	CONF-8305104—1
	8:44089	CONF-8305104—2
	8:44216	Physical Review [Section] B: Condensed Matter 27 NO. 8. 4535-4552 (15 Apr 1983).
	8:44247	Physical Review [Section] B: Condensed Matter 27 NO. 11. 6849-6852 (1 Jun 1983).
	8:44250	Physical Review [Section] B: Condensed Matter 27 NO. 7. 4161-4172 (1 Apr 1983).
	8:44252	Physical Review [Section] B: Condensed Matter 27 NO. 5. 2770-2780 (1 Mar 1983).
	8:44309	Physical Review [Section] B: Condensed Matter 27 NO. 7. 4317-4324 (1 Apr 1983).
	8:44312	Spectroscopy Letters 16 NO. 3. 181-191 (Mar 1983).
	8:44336	Journal of Chemical Physics 79 NO. 2. 1100-1101 (15 Jul 1983).
	Trieste Univ. (Italy). Ist. di Fisica Teorica	
	8:44358	CONF-830233—1
	8:44367	Inorganic Chemistry 21 NO. 9. 3382-3385 (Sep 1982).
	Argonne National Lab., IL (USA)	
	8:44440	CONF-8305103—1
	8:44441	CONF-8305103—2
	8:44513	CONF-830311—182
	8:44652	ANL/EES-TM—227-Vol.2
	8:44658	ANL/EES-TM—212-Vol.4
	8:44697	DOE/EV—0005/39
	8:44900	Physical Review Letters 50 NO. 13. 954-957 (28 Mar 1983).
	8:44935	Physical Review [Section] D: Particles and Fields 27 NO. 11. 2686-2707 (1 Jun 1983).
	8:44969	CONF-830862—1
	8:44987	Physical Review [Section] C: Nuclear Physics 27 NO. 3. 1353-1355 (Mar 1983).
	8:45024	Physical Review [Section] C: Nuclear Physics 27 NO. 5. 2058-2062 (May 1983).
	8:45025	Physical Review [Section] C: Nuclear Physics 27 NO. 5. 2239-2247 (May 1983).
	8:45079	Physical Review [Section] B: Condensed Matter 27 NO. 7. 4157-4160 (1 Apr 1983).

Contract No.	Abstract No.	Report No.
	8:45198	CONF-820545—23
W-7405-ENG-26	**Oak Ridge National Lab., TN (USA)**	
	8:43185	ORNL/FMP—83/2
	8:43221	Journal of the Environmental Engineering Division (American Society of Civil Engineers) 10
	8:43222	CONF-8205201—1
	8:43225	EPRI-AP—3006
	8:43256	ACS Symposium Series NO. 205. 259-279 (1982).
	8:43374	ORNL/TM—8798
	8:43399	ORNL-tr—4994([nd]).
	8:43408	NUREG/CR—0200-Vol.1-R2
	8:43409	NUREG/CR—0200-Vol.2-Rev.1
	Oak Ridge Y-12 Plant, TN (USA)	
	8:43413	Y/DW—406
	8:43421	
	8:43649	Journal of the Society of Environmental Engineers 104 NO. 4. 340-344 (Nov 1982).
	Zaininger Engineering Co., San Jose, CA (USA)	
	8:43718	ORNL/SUB—82/69604/1
	8:43723	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Power Apparatus a
	Oak Ridge National Lab., TN (USA)	
	8:43785	NUREG/CR—3161
	8:43786	NUREG/CR—3333
	8:43861	
	8:43893	ORNL/TM—8747
	8:43934	NUREG/CR—2000-Vol.2-No.6
	8:44026	ORNL/TM—8771
	Putnam, Hayes and Bartlett, Inc., Cambridge, MA (USA)	
	8:44028	DOE/NBM—3015045
	8:44041	EPRI-AP—2884-SR(Feb 1983).
	8:44215	Physical Review [Section] B: Condensed Matter 27 NO. 10. 6564-6567 (15 May 1983).
	8:44236	
	8:44237	
	8:44238	
	8:44239	
	8:44240	
	California Univ., San Diego, La Jolla (USA). Inst. of Pure and Applied Physical Sciences	
	8:44242	CONF-820659—11
	Oak Ridge National Lab., TN (USA)	
	8:44261	CONF-8206201—1-Draft
	8:44287	Journal of Applied Physics 54 NO. 7. 3825-3832 (Jul 1983).
	8:44294	Journal of Applied Physics 54 NO. 6. 3098-3100 (Jun 1983).
	8:44298	Journal of Applied Physics 54 NO. 6. 3220-3235 (Jun 1983).
	Oak Ridge Y-12 Plant, TN (USA)	
	8:44328	Y/DK—345
	8:44333	
	Oak Ridge National Lab., TN (USA)	
	8:44452	NUREG/CR—3122
	8:44459	Journal of Applied Physics 54 NO. 6. 3566-3572 (Jun 1983).
	8:44650	Applied Optics 22 NO. 7. 967-969 (1 Apr 1983).
	8:44706	ORNL/TM—5286
	8:44710	DOE/NBB—0037
	8:44713	EDFB/IBP—77/5
	8:44729	CONF-830671—1
	8:44808	Mutation Research 99 1-12 (1982).
	8:44837	CONF-8206205—1
	8:44894	Physical Review Letters 50 NO. 15. 1114-1117 (11 Apr 1983).
	8:44895	Physical Review Letters 50 NO. 15. 1118-1121 (11 Apr 1983).
	8:44904	Proceedings of the International Conference on Lasers 403-410 (1981).
	8:44968	Nuclear Data Sheets 37 NO. 1. 1-203 (Sep 1982).
	8:45057	ORNL-tr—5033(10 Apr 1980).
	8:45146	ORNL/TM—8234
	8:45147	ORNL/TM—8699
	8:45158	Physics of Fluids 26 NO. 7. 1830-1835 (Jul 1983).
	8:45173	Physics of Fluids 26 NO. 6. 1391-1394 (Jun 1983).
	8:45176	Physics of Fluids 26 NO. 6. 1516-1525 (Jun 1983).
	8:45180	Physics of Fluids 26 NO. 6. 1551-1558 (Jun 1983).
	8:45199	CONF-830406—63
	8:45256	ORNL/FEDC—83/1
	8:45257	ORNL/TM—8601
	8:45305	ORNL/CSD—120
	Oak Ridge Y-12 Plant, TN (USA)	
	8:45318	Y/DL—759
	Oak Ridge National Lab., TN (USA)	
	8:45321	CONF-8210120—
W-7405-ENG-36	**Los Alamos National Lab., NM (USA)**	
	8:43306	LA—9777-MS
	8:43331	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science 3
	8:43347	DOE/UMT—0263
	8:43348	DOE/UMT—0265
	8:43356	LA—9325-MS
	8:43357	LA—9510-MS
	8:43358	LA—9655-MS
	8:43359	LA—9666-PR
	8:43405	LA—9781-M
	8:43406	LA—9824-MS
	8:43410	NUREG/CR—3221
	8:43417	LA—9813-PR
	8:43479	CONF-800972—(1980).
	8:43894	LA—4037-SOP-Rev.2-Suppl.1
	8:43981	LA—9796-MS
	8:44044	LA—9815-C
	8:44172	LA-UR—83-1724
	8:44327	LA-UR—83-1854
	8:44399	LA-UR—83-1851
	8:44457	Review of Scientific Instruments 54 NO. 7. 875-878 (Jul 1983).
	8:44458	Journal of Applied Physics 54 NO. 6. 3528-3533 (Jun 1983).
	8:44552	LA-UR—83-1808
	8:44618	LA—9350-M
	8:44639	LA-UR—83-1699
	8:44800	LA—9804-MS
	8:44930	LA-UR—83-1839
	8:44975	LA-UR—83-1746
	8:44983	Physical Review [Section] C: Nuclear Physics 27 NO. 4. 1611-1620 (Apr 1983).
	8:45049	LA—9752-MS
	8:45088	Annals of Physics (New York) 146 NO. 2. 262-288 (1 Apr 1983).
	8:45186	Review of Scientific Instruments 54 NO. 6. 673-676 (Jun 1983).
	8:45253	LA—9687-MS
	8:45254	LA—9755-PR
	8:45255	LA—9761-MS
	8:45303	LA—9698-MS
W-7405-ENG-48	**Lawrence Livermore National Lab., CA (USA)**	
	8:43186	UCRL—89010

Contract No.	Abstract No.	Report No.
	8:43416	IEEE (Institute of Electrical and Electronics Engineers) Transactions on Nuclear Science 3
	8:43601	CONF-800972—(1980).
	8:43612	CONF-800972—(1980).
	Lawrence Berkeley Lab., CA (USA)	
	8:43652	LBL—3220-Vol.1
	Lawrence Livermore National Lab., CA (USA)	
	8:43877	NUREG/CR—3132
	8:43939	NUREG/CR—2915(83)
	8:43952	UCRL—86245
	8:43967	UCRL-Trans—11695(1980).
	8:43990	CONF-721002—
	8:44199	UCRL—88635
	8:44200	UCRL—88870
	8:44201	UCRL—88901
	8:44218	Physical Review [Section] B: Condensed Matter 27 NO. 8. 4632-4636 (15 Apr 1983).
	8:44244	UCID—19833
	8:44342	Inorganic Chemistry 21 NO. 9. 3437-3442 (Sep 1982).
	8:44344	
	8:44347	
	8:44355	International Journal of Quantum Chemistry 21 411-418 (1982).
	8:44401	UCRL—53420
	8:44402	Journal of Applied Physics 54 NO. 6. 2970-2982 (Jun 1983).
	8:44404	Applied Optics 22 NO. 9. 1288-1292 (1 May 1983).
	8:44406	Applied Optics 22 NO. 8. 1131-1132 (15 Apr 1983).
	8:44409	
	California Univ., Davis (USA)	
	8:44443	UCID—19838
	Lawrence Livermore National Lab., CA (USA)	
	8:44447	UCID—19752
	8:44454	UCRL—88536
	8:44455	UCRL—88639
	8:44456	Review of Scientific Instruments 54 NO. 7. 871-874 (Jul 1983).
	Perkin-Elmer Corp., Norwalk, CT (USA). Electro-Optical Div.	
	8:44644	UCRL—15541
	Lawrence Livermore National Lab., CA (USA)	
	8:44645	UCRL—88917
	8:44690	UCID—19829
	8:44691	UCRL—51444-82
	8:44692	UCRL—53423
	8:44693	UCRL—88516
	Ocean Research Consultants, La Jolla, CA (USA)	
	8:44727	UCRL—15534
	Lawrence Livermore National Lab., CA (USA)	
	8:44801	UCRL—88257
	8:44815	UCRL—89161
	8:44977	UCRL—89336
	8:45006	Physical Review [Section] C: Nuclear Physics 27 NO. 4. 1745-1753 (Apr 1983).
	8:45052	Physical Review Letters 50 NO. 15. 1110-1113 (11 Apr 1983).
	8:45161	Physics of Fluids 26 NO. 7. 1851-1865 (Jul 1983).
	8:45164	Physics of Fluids 26 NO. 7. 1888-1891 (Jul 1983).
	8:45165	Physics of Fluids 26 NO. 7. 1892-1903 (Jul 1983).
	8:45168	Physics of Fluids 26 NO. 7. 1965-1986 (Jul 1983).
	8:45190	Physical Review Letters 50 NO. 13. 1019 (28 Mar 1983).
	8:45259	UCAR—10042-82
	8:45260	UCID—19808
	8:45261	UCRL—15537
	8:45262	UCRL—87700
	8:45263	UCRL—88872
	8:45264	UCRL—89016
	8:45265	UCRL—89396
	8:45314	UCID—18852-Rev.1
	8:45315	UCID—19806
	8:45316	UCID—19821
	8:45317	UCRL—89383
W-7405-ENG-82	**Ames Laboratory and Department of Physics, Iowa State University, Ames, Iowa 50011**	
	8:44203	Physical Review [Section] B: Condensed Matter 27 NO. 12. 7013-7017 (15 Jun 1983).
	8:44219	Physical Review [Section] B: Condensed Matter 27 NO. 8. 4654-4660 (15 Apr 1983).
	8:44245	Physical Review [Section] B: Condensed Matter 27 NO. 11. 6703-6712 (1 Jun 1983).
	8:44310	Physical Review [Section] B: Condensed Matter 27 NO. 5. 2800-2806 (1 Mar 1983).
	8:44343	Inorganic Chemistry 21 NO. 9. 3290-3295 (Sep 1982).
	8:45032	Physical Review [Section] C: Nuclear Physics 27 NO. 5. 2340-2355 (May 1983).
	8:45033	Physical Review [Section] C: Nuclear Physics 27 NO. 5. 2356-2362 (May 1983).

REPORT NUMBER INDEX

The numbers assigned to all reports cited in the publication appear in the first column of the index. Cross reference information and/or availability are included as appropriate. Abbreviations used in the availability column are elaborated at the end of the index. To expedite the filling of orders for reports from NTIS and TIC, an order number in the form, DE82000001, appears in column 3. Requesters are urged to use this order number where provided. In column 4, one or more DOE distribution categories are indicated, e.g. , STD-10, MN-25. STD indicates distribution was made in full-size copy; MN indicates microcopy distribution. These category numbers are included to assist DOE librarians in responding to requests for reports in their collections. The UC (Unclassified Distribution Categories) are defined in DOE/TIC-4500, available from TIC. The citation numbers are given in column 5. NOTE: DOE attempts to disseminate its information as broadly as possible. Even though a report may contain some degree of illegibility, it is believed that the report may still make a contribution. The presence of a 1, 2, or 3 following NTIS in the availability column denotes the extent to which a report may be illegible and the form in which it is available: 1 = 1 to 5% illegibility, available PC and MF; 2 = 6 to 10% illegibility, available MF only; 3 = 11% or more illegibility, available PC only.

Report No.	*Availability*	*Order No.*	*Distribution Category*	*Abstract No.*
AECB-				
1184	NTIS (US Sales Only), PC A02/MF A01	DE83701835	MN -2	8:44374
1187	NTIS (US Sales Only), PC A02/MF A01	DE83701836	MN -2	8:44375
AECL-				
6834	NTIS (US Sales Only), PC A04/MF A01	DE83701829	MN -70	8:43337
7086	NTIS (US Sales Only), PC A03/MF A01	DE83701833	MN -2	8:43832
7519	NTIS (US Sales Only), PC A02/MF A01	DE83701806	MN -80	8:43867
7606	NTIS (US Sales Only), PC A03/MF A01	DE83701807	MN -80	8:43793
7685	NTIS (US Sales Only), PC A03/MF A01	DE83701830	MN -70	8:43338
7687	NTIS (US Sales Only), PC A03/MF A01	DE83701808	MN -80	8:43868
7688	NTIS (US Sales Only), PC A03/MF A01	DE83701811	MN -80	8:43796
AEEW-R-				
1506	NTIS (US Sales Only), PC A04/MF A01	DE83701796	MN -78	8:43896
1529	NTIS (US Sales Only), PC A02/MF A01	DE83701797	MN -78	8:43897
1531	NTIS (US Sales Only), PC A06/MF A01	DE83701798	MN -78	8:43898
1534	AEEW, Technology Division, Winfrith, Dorchester, England		ND -70	8:43339
1636	Winfrith Secretariat, Atomic Energy Establishment, Winfrith Dorchester, Dorset, England		ND -92a	8:43291
AERE-R-				
10341	H.M. Stationery Office, Price Pound 6.00			8:43392
10388	NTIS (US Sales Only), PC A03/MF A01	DE83702198	MN -70	8:43340
ANAEM-FR-				
81	NTIS (US Sales Only), PC A08/MF A01	DE83702225	MN -2	8:45285
ANL-				
83-3	NTIS, PC A08/MF A01	DE83015740	STD -79d	8:43797
83-11-Vol.1	*See* NUREG/CR-3359-Vol.1	DE83015044	MN -79p	8:43945
83-43	NTIS, PC A03/MF A01	DE83015753	STD -79k	8:43798
83-56	NTIS, PC A02/MF A01	DE83015748	STD -79k	8:43799
ANL/EES-TM-				
212-Vol.4	NTIS, PC A17/MF A01; 1	DE83014459	MN -11	8:44658
224	NTIS, PC A05/MF A01	DE83015742	MN -38	8:43541
227-Vol.2	NTIS, PC A06/MF A01	DE83015768	MN -41	8:44652
ANL-OHS/HP-				
83-101	*See* DOE/EV-0005/39	DE83015739	STD -70A	8:44697
ARI-RP-				
150	NTIS, PC A02/MF A01	DE83014091	MN -90i	8:44659
ARL/TR-				
050	NTIS (US Sales Only), PC A08/MF A01	DE83780995	MN -34A	8:44835
BDX-				
613-2920	NTIS, PC A02/MF A01	DE83008315	MN -38	8:44450
613-2957	NTIS, PC A03/MF A01	DE83015353	MN -38	8:44371
BEOP-				
1	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -59a	8:43477
2	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -59a	8:43478
4	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -60	8:43666
5	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -94b	8:44010
6	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -59a	8:43544

Report No.	Availability	Order No.	Distribution Category	Abstract No.
7	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -60	8:43667
8	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -60	8:43668
12	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -60	8:43677
13	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -59a	8:43545
14	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -94	8:43968
BMFT-FB-HA-				
82-046	NTIS (US Sales Only), PC A05/MF A01; 1	DE83751155	MN -38	8:44120
83-005	NTIS (US Sales Only), PC A07/MF A01	DE83750905	MN -70	8:43400
BMFT-FB-T-				
82-198	NTIS (US Sales Only), PC A03/MF A01	DE83750200	MN -62	8:43533
82-201	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750199	MN -60	8:43680
82-202	NTIS (US Sales Only), PC A09/MF A01; 1	DE83750198	MN -95	8:44092
82-203	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750207	MN -90c	8:43146
83-031	NTIS (US Sales Only), PC A12/MF A01; 1	DE83751037	MN -88	8:43247
83-038	NTIS (US Sales Only), PC A03/MF A01; 1	DE83751035	MN -89	8:43147
83-039	NTIS (US Sales Only), PC A08/MF A01	DE83750923	MN -48	8:44760
83-046	NTIS (US Sales Only), PC A07/MF A01; 1	DE83751034	MN -90e	8:43257
83-055	NTIS (US Sales Only), PC A07/MF A01; 1	DE83751036	MN -90	8:43188
83-062	NTIS (US Sales Only), PC A02/MF A01	DE83751040	MN -25	8:44241
83-067	NTIS (US Sales Only), PC A06/MF A01; 1	DE83751038	MN -25	8:43189
83-068	NTIS (US Sales Only), PC A05/MF A01; 1	DE83751039	MN -90a	8:43190
83-073	NTIS (US Sales Only), PC A04/MF A01; 1	DE83751043	MN -90d	8:43735
83-074	NTIS (US Sales Only), PC A04/MF A01	DE83751042	MN -94a	8:43971
83-078	NTIS (US Sales Only), PC A06/MF A01; 1	DE83751044	MN -59c	8:43546
83-081	NTIS (US Sales Only), PC A03/MF A01	DE83751045	MN -63d	8:43490
83-134	NTIS (US Sales Only), PC A03/MF A01	DE83751156	MN -63	8:44323
BNL-				
33010	NTIS, PC A05/MF A01	DE83014104	MN -13	8:45284
33058	NTIS, PC A02/MF A01; 1	DE83015051	MN -77	8:43818
33129	NTIS, PC A05/MF A01; 1	DE83014424	MN -66e	8:43664
33149	NTIS, PC A02/MF A01	DE83015149	MN -80	8:43836
33166	NTIS, PC A02/MF A01	DE83014876	MN -34	8:45028
33218	NTIS, PC A02/MF A01	DE83014443	MN -28	8:44509
33259	NTIS, PC A02/MF A01; 1	DE83015052	MN -28	8:44510
33263	NTIS, PC A02/MF A01	DE83014770	MN -34D	8:44912
33272	NTIS, PC A02/MF A01	DE83014763	MN -28	8:44511
33273	NTIS, PC A02/MF A01; 1	DE83014764	MN -28	8:44512
33292	NTIS, PC A04/MF A01; 1	DE83014769	MN -93	8:44061
33324	NTIS, PC A03/MF A01; 1	DE83015198	MN -34D	8:44561
51627	NTIS, PC A04/MF A01	DE83015182	STD -59c	8:43547
BNL-NUREG-				
51492	*See* NUREG/CR-2475	DE83014967	MN -78	8:43935
51664	*See* NUREG/CR-3241	DE83015644	MN -79p	8:43941
51672	*See* NUREG/CR-3283	DE83015643	MN -80	8:43943
51678	*See* NUREG/CR-3315	DE83015645	MN -80	8:43944
CBPF-CS-				
002/ 81	NTIS (US Sales Only), PC A05/MF A01	DE83702201	MN -2	8:44016
CEA-CONF-				
6166	NTIS (US Sales Only), PC A02/MF A01	DE83701812	MN -37	8:44562
6278	NTIS (US Sales Only), PC A02/MF A01	DE83701825	MN -70	8:43341
6353	NTIS (US Sales Only), PC A02/MF A01	DE83701800	MN -78	8:43758
6355	NTIS (US Sales Only), PC A02/MF A01	DE83701810	MN -79	8:43800
6359	NTIS (US Sales Only), PC A02/MF A01	DE83701813	MN -37	8:44563
6371	NTIS (US Sales Only), PC A02/MF A01	DE83701801	MN -78	8:43759
6375	NTIS (US Sales Only), PC A02/MF A01	DE83701802	MN -78	8:43760
6391	NTIS (US Sales Only), PC A02/MF A01	DE83701803	MN -78	8:43761
6394	NTIS (US Sales Only), PC A02/MF A01	DE83701821	MN -37	8:44629
6402	NTIS (US Sales Only), PC A03/MF A01	DE83702071	MN -41	8:43874
6414	NTIS (US Sales Only), PC A02/MF A01	DE83702074	MN -41	8:43342
6434	NTIS (US Sales Only), PC A02/MF A01	DE83702128	MN -25	8:43883
6435	NTIS (US Sales Only), PC A02/MF A01	DE83702129	MN -25	8:43884
6445	NTIS (US Sales Only), PC A02/MF A01	DE83702158	MN -80	8:43885
6455	NTIS (US Sales Only), PC A02/MF A01	DE83702131	MN -80	8:43837
6456	NTIS (US Sales Only), PC A02/MF A01	DE83702076	MN -48	8:44761
6457	NTIS (US Sales Only), PC A02/MF A01	DE83702077	MN -48	8:44762
6458	NTIS (US Sales Only), PC A02/MF A01	DE83702078	MN -48	8:44763
6459	NTIS (US Sales Only), PC A02/MF A01	DE83702147	MN -78	8:43762
6460	NTIS (US Sales Only), PC A03/MF A01	DE83702148	MN -78	8:43763
6471	NTIS (US Sales Only), PC A02/MF A01	DE83702152	MN -77	8:43789
6474	NTIS (US Sales Only), PC A02/MF A01	DE83702079	MN -48	8:44764
6482	NTIS (US Sales Only), PC A02/MF A01	DE83702088	MN -38	8:43853
6484	NTIS (US Sales Only), PC A02/MF A01	DE83702080	MN -48	8:44765
6573	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750927	MN -04	8:44757
6590	NTIS (US Sales Only), PC A02/MF A01	DE83703392	MN -20	8:44836
6391	NTIS (US Sales Only), PC A02/MF A01; 3	DE83750928	MN -62	8:43534

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CEA-N-2301	NTIS (US Sales Only), PC A04/MF A01	DE83701822	MN -37	8:44630
CEA-R-5176	NTIS (US Sales Only), PC A07/MF A01	DE83701814	MN -37	8:44564
5181	NTIS (US Sales Only), PC A05/MF A01	DE83702075	MN -41	8:44565
5182	NTIS (US Sales Only), PC A05/MF A01	DE83702132	MN -80	8:43838
5188	NTIS (US Sales Only), PC A03/MF A01	DE83702161	MN -37	8:44566
CEA-tr-1-739-6	NTIS (US Sales Only), PC A02/MF A01/ Available from CEN Saclay, Service de Documentation, 91191 - Gif-sur-Yvette Cedex (France)	DE83750926	MN -41	8:44805
CERN-EP/ 82-29	NTIS (US Sales Only), PC A03/MF A01	DE83902502	MN -28	8:44913
CERN-EP-82-39	NTIS (US Sales Only), PC A02/MF A01; 1	DE83902485	MN -34D	8:44914
CNAEM-R-218	NTIS (US Sales Only), PC A03/MF A01	DE83702226	MN -2	8:45286
CONF-721002-	(Interagency conference on the environment, Livermore, CA, USA, 17-19 Oct 1972) NTIS, PC A16/MF A01	DE83005675	STD -11	8:43990
CONF-7704133-1	(Comite Francais d'Electrothermie symposium, Verailles, France, 21-22 Apr 1977) *See* OA-tr-1863	DE83001770	MN -95f	8:44106
CONF-781109-31	(Environmental control symposium, Washington, DC, USA, 28-30 Nov 1978) *See* PNL-SA-7279	DE83014874	MN -70	8:43376
CONF-800194-	(3. meeting on ultra high vacuum techniques for accelerators and storage rings, Oho, Ibaraki, Japan, 24-25 Jan 1980) *See* KEK-81-2	DE83780994	MN -28	8:44448
CONF-8002105-	(Study meeting on heat transfer and structural problems in nuclear facilities, Tokai, Japan, 4 Feb 1980) *See* UTNL-R-0092	DE83780865	MN -20	8:45269
CONF-800972-	(1980 Department of Energy passive and hybrid solar energy program update meeting, Washington, DC, USA, 21-24 Sep 1980) NTIS, PC A16/MF A01; 1	DE82021979	STD -59	8:43548
CONF-8010330-	(Symposium on inertial fusion with heavy ion beam, Tokyo, Japan, 22 Oct 1980) *See* INS-NUMA-28	DE83780993	MN -34	8:44878
CONF-8010335-PAPB	(Industrial power - electrical rates, reliability, and energy management conference, New York, NY, USA, 7-8 Oct 1980) New York, NY; McGraw-Hill Publications Company (1980).			8:43734
CONF-810293-No.5	(2. all-union conference on radiation physics of solids, Zvenigorod, USSR, 24-27 Feb 1981) *See* INIS-SU-147	DE83780874	MN -25	8:44280
CONF-810298-	(National symposium on applications of nuclear and allied techniques in public health and pollution control, Bombay, India, 12-13 Feb 1981) NTIS (US Sales Only), MF A01; 2	DE83902554	MN -23	8:44005
CONF-810425-7	(International conference on metallurgical coatings, San Francisco, CA, USA, 6-10 Apr 1981) *See* PNL-SA-9157	DE83014645	MN -25	8:44194
8	*See* UNI-SA-114	DE83015300	MN -80	8:43788
CONF-8104185-	(2. national meeting of reactor physics, Rio de Janeiro, Brazil, 13-15 Apr 1981) *See* INIS-mf-7666	DE83780890	MN -80	8:43843
CONF-810520-8	(Symposium on separation science and technology for energy applications, Gatlinburg, TN, USA, 5-8 May 1981) *See* PNL-SA-9720	DE83015091	MN -90b	8:43254
CONF-8105160-	(Seminar on the development of radioprotection techniques for nuclear energy workers, Cadarache, France, 5-7 May 1981)			
CONF-8105220-3	*See* CEA-CONF-6166	DE83701812	MN -37	8:44562
CONF-810760-	(International Atomic Energy Agency specialists' meeting on subcritical crack growth, Freiburg, F.R. Germany, 13-15 May 1981) *See* NUREG/CP-0044-Vol.1	DE83902448	MN -80	8:43751
CONF-8107102-24	(International conference on high energy physics (Or European Physical Society conference), Lisbon, Portugal, 9-15 Jul 1981) *See* CERN-EP/82-29	DE83902502	MN -28	8:44913
CONF-8108146-16	(36. annual conference of Brazilian Association of Metals, Recife, Brazil, 5-10 Jul 1981) *See* INIS-mf-7614	DE83780920	MN -78	8:43769
17	*See* INIS-mf-7625	DE83780929	MN -78	8:43770
	(10. conference on the law of the world, Sao Paulo, Brazil, 16-21 Aug 1981) *See* INIS-mf-7608	DE83780937	MN -2	8:44024
CONF-810964-1	*See* INIS-mf-7607	DE83780934	MN -2	8:44023
4	(Seminar on iodine removal from gaseous effluents in the nuclear industry, Mol, Belgium, 21-24 Sep 1981) *See* CEA-CONF-6402	DE83702071	MN -41	8:43874

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-8109117-	(Seminar on research reactor operation and use, Juelich, F.R. Germany, 14-18 Sep 1981)			
4	*See* IPEN-Pub-43	DE83702159	MN -80	8:43890
CONF-811025-	(25. conference on analytical chemistry and nuclear technology, Gatlinburg, TN, USA, 6 Oct 1981)			
3	*See* SAND-81-1405C	DE81030709	MN -4	8:43381
CONF-811035-	(21. Hanford life sciences symposium on biological availability of trace metals, Richland, WA, USA, 4-8 Oct 1981)			
8	*See* PNL-SA-9916	DE83014097	MN -48	8:44759
CONF-8110236-	(International study meeting on modern power stations, Liege, Belgium, 26-30 Oct 1981)			
20	*See* INIS-mf-7359	DE83780888	MN -2	8:44020
CONF-8110258-	(IAEA conference on influence of power reactor water chemistry on fuel cladding reliability, San Miniato, Italy, 12-16 Oct 1981)			
1	*See* AECL-7606	DE83701807	MN -80	8:43793
CONF-811101-	(Winter annual meeting of the American Society of Mechanical Engineers, Washington, DC, USA, 15-20 Nov 1981)			
33	*See* PNL-SA-9530	DE83015431	MN -12	8:44432
34	*See* PNL-SA-9501	DE83015299	MN -38	8:44431
CONF-811103-	(ANS winter meeting, San Francisco, CA, USA, 29 Nov-4 Dec 1981)			
130	*See* PNL-SA-9992	DE83015075	MN -2	8:43949
131	*See* PNL-SA-9729	DE83015093	MN -80	8:43948
CONF-811195-	(Europhysics conference on the search for charm, beauty and truth at high energy, Erice, Italy, 15-22 Nov 1981)			
8	*See* CERN-EP-82-39	DE83902485	MN -34D	8:44914
CONF-811240-	(Workshop on hydraulic fracturing stress measurements, Monterey, CA, USA, 1-5 Dec 1981)			
3	*See* LBL-14202	DE83014864	MN -11	8:43363
CONF-811255-	(3. all-union symposium on scanning electron microscopy and the analytical method of examining solid materials, Zvenigorod, USSR, 1 Dec 1981)			
1	*See* JINR-R-7-81-744	DE83702196	MN -37	8:44602
CONF-811269-	(National Association of Technical Research colloquium on high speed movies instrumentation and applications, Paris, France, 9-10 Dec 1981)			
1	*See* CEA-CONF-6394	DE83701821	MN -37	8:44629
CONF-811273-	(6. Brazilian congress of mechanical engineering, Rio de Janeiro, Brazil, 15-18 Dec 1981)			
2	*See* INIS-mf-7642	DE83780889	MN -80	8:43855
3	*See* INIS-mf-7629	DE83780895	MN -38	8:44411
4	*See* INIS-mf-7630	DE83780896	MN -38	8:44412
7	*See* INIS-mf-7633	DE83780899	MN -38	8:44414
8	*See* INIS-mf-7634	DE83780900	MN -38	8:44415
11	*See* INIS-mf-7640	DE83780903	MN -38	8:44417
12	*See* INIS-mf-7641	DE83780904	MN -38	8:44418
13	*See* INIS-mf-7644	DE83780905	MN -38	8:44419
14	*See* INIS-mf-7645	DE83780906	MN -38	8:44420
15	*See* INIS-mf-7647	DE83780907	MN -38	8:44421
16	*See* INIS-mf-7648	DE83780908	MN -38	8:44906
17	*See* INIS-mf-7650	DE83780909	MN -38	8:44422
18	*See* INIS-mf-7652	DE83780910	MN -38	8:44381
19	*See* INIS-mf-7653	DE83780911	MN -38	8:44423
20	*See* INIS-mf-7655	DE83780912	MN -38	8:44382
21	*See* INIS-mf-7659	DE83780913	MN -38	8:44424
23	*See* INIS-mf-7662	DE83780915	MN -38	8:44426
24	*See* INIS-mf-7663	DE83780916	MN -38	8:44427
25	*See* INIS-mf-7665	DE83780917	MN -38	8:44907
26	*See* INIS-mf-7627	DE83780918	MN -25	8:44140
27	*See* INIS-mf-7649	DE83780919	MN -25	8:44141
28	*See* INIS-mf-7643	DE83780921	MN -80	8:44379
29	*See* INIS-mf-7651	DE83780922	MN -80	8:44380
30	*See* INIS-mf-7656	DE83780923	MN -80	8:44383
31	*See* INIS-mf-7657	DE83780924	MN -80	8:43856
32	*See* INIS-mf-7664	DE83780925	MN -80	8:44384
33	*See* INIS-mf-7658	DE83780926	MN -80	8:43864
34	*See* INIS-mf-7635	DE83780930	MN -78	8:43771
35	*See* INIS-mf-7637	DE83780931	MN -78	8:43772
36	*See* INIS-mf-7646	DE83780932	MN -78	8:43773
37	*See* INIS-mf-7654	DE83780933	MN -78	8:43774
38	*See* INIS-mf-7636	DE83780938	MN -38	8:44378
39	*See* INIS-mf-7628	DE83780894	MN -38	8:44410
CONF-820173-	(Conference on evaluation of research and development, Brussels, Belgium, 25-26 Jan 1982)			
	See EUR-7897-FR			8:44011
CONF-820282-	(Israel Optical Society winter school on high power lasers and applications, Tel-Aviv, Israel, 1 Feb 1982)			
1	*See* IA-1374	DE83902608	MN -20	8:45220
CONF-820338-	(Symposium on accelerator aspects of ion fusion, Darmstadt, F.R. Germany, 29 Mar-2 Apr 1982)			
	See GSI-82-8	DE83750205	MN -28	8:44468
CONF-820420-	(International ENS/ANS conference on nuclear energy with emphasis on fuel cycles, Brussels, Belgium, 26-30 Apr 1982)			
13	*See* NUCLEBRAS-CDTN-441/82	DE83702150	MN -78	8:43831

Report No.	Availability	Order No.	Distribution Category	Abstract No.
14	*See* PNL-SA-9928	DE83014642	MN -80	8:43813
CONF-820428-	(Conference on lasers in nuclear physics, Oak Ridge, TN, USA, 21-23 Apr 1982)			
10	*See* KFK-3344	DE83750201	MN -34A	8:44879
CONF-8204114-	(Simulation symposium on reactor dynamics and plant control, Mississauga, Canada, 19-20 Apr 1982)			
1	*See* AECL-7687	DE83701808	MN -80	8:43868
2	*See* AECL-7688	DE83701811	MN -80	8:43796
CONF-8204117-	(Energy conference within the context of the Hannover Fair, Hannover, F.R. Germany, 21-28 Apr 1982)			
2	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770138	MN -95d	8:44067
3	NTIS (US Sales Only), PC A02/MF A01	DE83770184	MN -95e	8:44093
CONF-8204122-	(Seminar on fuel storage, Leningrad, USSR, 20-27 Apr 1982)			
1	*See* CEA-CONF-6414	DE83702074	MN -41	8:43342
CONF-820512-	(ASME material handling conference, Houston, TX, USA, 16-18 May 1982)			
2	*See* PNL-SA-9981	DE83014980	MN -88	8:43255
CONF-820545-	(5. International conference on plasma surface, Gatlinburg, TN, USA, 3-5 May 1982)			
23	NTIS, PC A02/MF A01; 1	DE83014716	MN -20	8:45198
CONF-820566-	(Thermal reactor benchmark calculations, techniques, results and applications seminar, Upton, NY, USA, 17-18 May 1982)			
10	*See* CEA-CONF-6353	DE83701800	MN -78	8:43758
CONF-820580-	(4. symposium on biotechnology in energy production and conservation, Gatlinburg, TN, USA, 11-14 May 1982)			
	Biotechnol. Bioeng. Symp., No. 12, 337-348(1982)			8:43187
	Biotechnol. Bioeng. Symp., No. 12, 441-450(1982)			8:43418
	Biotechnol. Bioeng. Symp., No. 12, 469-474(1982)			8:43419
	New York, NY; John Wiley and Sons, Inc. (1982).		ND -61a	8:43421
	Biotechnol. Bioeng. Symp., No. 12, 15-29(1982)			8:43443
	Biotechnol. Bioeng. Symp., No. 12, 279-283(1982)			8:43444
	Biotechnol. Bioeng. Symp., No. 12, 303-316(1982)			8:43445
	Biotechnol. Bioeng. Symp., No. 12, 349-363(1982)			8:43446
	Biotechnol. Bioeng. Symp., No. 12, 381-398(1982)			8:43447
	Biotechnol. Bioeng. Symp., 24: No. 12, 45-56(1982)			8:43457
	Biotechnol. Bioeng. Symp., No. 12, 81-89(1982)			8:43458
	Biotechnol. Bioeng. Symp., No. 12, 91-102(1982)			8:43459
	Biotechnol. Bioeng. Symp., No. 12, 103-110(1982)			8:43460
	Biotechnol. Bioeng. Symp., No. 12, 121-138(1982)			8:43461
	Biotechnol. Bioeng. Symp., No. 12, 139-146(1982)			8:43462
	Biotechnol. Bioeng. Symp., No. 12, 147-159(1982)			8:43463
	Biotechnol. Bioeng. Symp., No. 12, 161-169(1982)			8:43464
	Biotechnol. Bioeng. Symp., No. 12, 183-191(1982)			8:43465
	Biotechnol. Bioeng. Symp., No. 12, 193-197(1982)			8:43466
	Biotechnol. Bioeng. Symp., No. 12, 199-202(1982)			8:43467
	Biotechnol. Bioeng. Symp., No. 12, 205-219(1982)			8:43468
	Biotechnol. Bioeng. Symp., No. 12, 221-231(1982)			8:43469
	Biotechnol. Bioeng. Symp., No. 12, 263-277(1982)			8:43470
	Biotechnol. Bioeng. Symp., No. 12, 31-43(1982)			8:43516
	Biotechnol. Bioeng. Symp., No. 12, 57-65(1982)			8:43517
	Biotechnol. Bioeng. Symp., No. 12, 67-72(1982)			8:43518
	Biotechnol. Bioeng. Symp., No. 12, 73-77(1982)			8:43519
	Biotechnol. Bioeng. Symp., No. 12, 111-120(1982)			8:43520
	Biotechnol. Bioeng. Symp., No. 12, 171-175(1982)			8:43521
	Biotechnol. Bioeng. Symp., No. 12, 177-182(1982)			8:43522
	Biotechnol. Bioeng. Symp., No. 12, 249-262(1982)			8:43523
	Biotechnol. Bioeng. Symp., No. 12, 297-300(1982)			8:43524
	Biotechnol. Bioeng. Symp., No. 12, 327-335(1982)			8:43525
	Biotechnol. Bioeng. Symp., No. 12, 413-439(1982)			8:43526
	Biotechnol. Bioeng. Symp., No. 12, 401-412(1982)			8:44059
	Biotechnol. Bioeng. Symp., No. 12, 285-290(1982)			8:44781
	Biotechnol. Bioeng. Symp., No. 12, 451-459(1982)			8:44782
	Biotechnol. Bioeng. Symp., No. 12, 461-467(1982)			8:44783
	Biotechnol. Bioeng. Symp., No. 12, 475-484(1982)			8:44784
CONF-820582-	(24. COSPAR meeting (Committee on Space Research), Ottawa, Canada, 17 May-2 Jun 1982)			
7	*See* CEA-CONF-6359	DE83701813	MN -37	8:44563
CONF-8205164-	(French Nuclear Energy Society meeting on nuclear waste, Paris, France, 13 May 1982)			
1	*See* CEA-CONF-6278	DE83701825	MN -70	8:43341
CONF-8205175-	(Joint meeting on migraine and cerebral ischemia, Marseille, France, 15 May 1982)			
1	*See* CEA-CONF-6484	DE83702080	MN -48	8:44765
CONF-8205201-	(16. annual conference on trace substance in environmental health, Columbia, MO, USA, 31 May-3 Jun 1982)			
1	NTIS, PC A02/MF A01	DE83014059	MN -90i	8:43222
CONF-8205202-	(DOE workshop on regulatory-financial models of the US electric utility industry, Los Alamos, NM, USA, 26-27 May 1982)			
Summ.	*See* LA-9815-C	DE83014773	STD -98F	8:44044
CONF-820659-	(4. conference on superconductivity in d- and f-band metals, Karlsruhe, F.R. Germany, 28-30 Jun 1982)			
11	NTIS, PC A02/MF A01; 1	DE83014625	MN -25	8:44242

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-820662-	(6. international conference on zirconium in the nuclear industry, Vancouver, BC, Canada, 28 Jun-1 Jul 1982)			
6	NTIS, PC A03/MF A01	DE83014687	MN -80	8:43899
CONF-8206165-	(IAEA specialist meeting on early diagnosis of failures in primary system components, Prague, Czechoslovakia, 19-26 Jun 1982)			
1	*See* CEA-CONF-6371	DE83701801	MN -78	8:43759
CONF-8206166-	(2. international symposium on applied modeling and simulations, Paris, France, 29 Jun-2 Jul 1982)			
1	*See* CEA-CONF-6375	DE83701802	MN -78	8:43760
CONF-8206167-	(SFEN meeting, Paris, France, 9 Jun 1982)			
1	*See* CEA-CONF-6355	DE83701810	MN -79	8:43800
CONF-8206172-	(2. All-Union seminar on automation of scientific research on nuclear physics and adjoining areas, Novosibirsk, USSR, 29 Jun-2 Jul 1982)			
1	*See* JINR-10-82-407	DE83702216	MN -32	8:43891
CONF-8206191-	(1. IAEA research coordination meeting on atomic collission data for diagnostics of magnetic fusion plasmas, Vienna, Austria, 21-25 Jun 1982)			
Summ.	*See* INDC(NDS)-136/GA	DE83702872	MN -20	8:45112
CONF-8206201-	(US/Japan seminar on recombination induced defect formation in crystals, Urbana, IL, USA, 2-5 Jun 1982)			
1-Draft	NTIS, PC A02/MF A01	DE83014058	MN -34	8:44261
CONF-8206205-	(Workshop on physics of submicron structures, Urbana, IL, USA, 28-30 Jun 1982)			
1	NTIS, PC A02/MF A01	DE83014007	MN -25	8:44837
CONF-820705-	(2. joint ASME/ANS nuclear engineering conference, Portland, OR, USA, 25-28 Jul 1982)			
14	*See* PNL-SA-9872	DE83014534	MN -70	8:43333
CONF-820748-	(Workshop on accreting neutron stars, Munchen, F.R. Germany, 18-23 Jul 1982)			
	See MPE-177	DE83780866	MN -34B	8:44825
CONF-820791-	(Workshop on environmental control technology for coal gasification, Palo Alto, CA, USA, 28-30 Jul 1982)			
	See EPRI-AP-3006	DE83013068	MN -90c	8:43225
CONF-820849-	(Summer study in energy efficient buildings, Santa Cruz, CA, USA, 22-28 Aug 1982)			
19-Rev.	*See* LBL-14914-Rev.	DE83014856	MN -95d	8:44081
CONF-8208121-	(EPRI conference on solar and wind power - 1982 status and outlook, Providence, RI, USA, 25-27 Aug 1982)			
	See EPRI-AP-2884-SR	DE83901829	MN -60	8:43536
CONF-8208141-	(9. annual international conference on coal gasification liquefaction and conversion to electricity, Pittsburgh, PA, USA, 3-5 Aug 1982)			
	NTIS, PC A24/MF A01; 1	DE83012243	MN -90	8:43148
CONF-820915-	(BNES international conference on gas cooled reactors today, Bristol, UK, 20-24 Sep 1982)			
7	*See* CEA-CONF-6471	DE83702152	MN -77	8:43789
CONF-820922-	(4. international symposium on wind energy systems, Stockholm, Sweden, 21-24 Sep 1982)			
Vol.1	Bedford, England; BHRA Fluid Engineering (1982).			8:43724
Vol.2	Bedford, England; BHRA Fluid Engineering (1982).			8:43669
CONF-820935-	(6. Yamada conference on neutron scattering of condensed matter, Tokyo, Japan, 1 Sep 1982)			
10	*See* CEA-CONF-6445	DE83702158	MN -80	8:43885
CONF-820942-	(Nuclear data for science and technology international conference, Antwerp, Belgium, 6-10 Sep 1982)			
28	*See* CEA-CONF-6455	DE83702131	MN -80	8:43837
35	*See* KFK-3449	DE83750924	MN -80	8:43849
CONF-820967-	(International topical meeting on irradiation technology, Grenoble, France, 28 Sep-1 Oct 1982)			
3	*See* CEA-CONF-6434	DE83702128	MN -25	8:43883
4	*See* CEA-CONF-6435	DE83702129	MN -25	8:43884
CONF-8209118-	(Meeting on radionuclides and brain disease, Crans-sur-Sierre, Switzerland, 7-10 Sep 1982)			
1	*See* CEA-CONF-6456	DE83702076	MN -48	8:44761
2	*See* CEA-CONF-6457	DE83702077	MN -48	8:44762
3	*See* CEA-CONF-6458	DE83702078	MN -48	8:44763
4	*See* CEA-CONF-6474	DE83702079	MN -48	8:44764
CONF-8209119-	(International symposium on detailed modelization of fluid flow, Paris, France, 7-10 Sep 1982)			
1	*See* CEA-CONF-6482	DE83702088	MN -38	8:43853
CONF-8209120-	(IAEA specialists' meeting on power ramping and cycling behaviour of water reactor fuel, Petten, Netherlands, 8-9 Sep 1982)			
1	*See* CEA-CONF-6459	DE83702147	MN -78	8:43762
CONF-8209121-	(Inter-regional training course on assuring pressure boundary integrity, Argonne, IL, USA, 8 Sep-8 Oct 1982)			
1	*See* CEA-CONF-6460	DE83702148	MN -78	8:43763
CONF-8209131-	(Conference of German experts in food chemistry, Braunschweig, F.R. Germany, 15-17 Sep 1982)			
1	NTIS (US Sales Only), PC A02/MF A01	DE83770136	MN -41	8:44741
CONF-8209143-	(36. international meeting of French Physical Chemistry Society, Paris, France, 27 Sep-1 Oct 1982)			
1	*See* CEA-CONF-6573	DE83750927	MN -04	8:44757

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-8209149-	(Australian uranium symposium, Frankfurt, F.R. Germany, 6-7 Sep 1982)			
3	NTIS (US Sales Only), PC A02/MF A01	DE83902566	MN -51	8:43311
4	NTIS (US Sales Only), PC A02/MF A01	DE83902565	MN -51	8:44017
7	NTIS (US Sales Only), PC A02/MF A01	DE83902562	MN -51	8:43332
8	NTIS (US Sales Only), PC A02/MF A01	DE83902550	MN -51	8:43307
9	NTIS (US Sales Only), PC A02/MF A01	DE83902561	MN -51	8:43308
CONF-821089-	(6. international workshop on laser interaction and related plasma phenomena, Monterey, CA, USA, 25-29 Oct 1982)			
13	*See* CEA-CONF-6590	DE83703392	MN -20	8:44836
CONF-8210110-	(International symposium on biological dosimetry, Neherberg, F.R. Germany, 14-16 Oct 1982)			
3	*See* UCRL-88257	DE83014961	MN -48	8:44801
CONF-8210120-	(Intergrated data users workshop, Reston, VA, USA, 13 Oct 1982)			
	NTIS, PC A09/MF A01; 1	DE83014761	MN -32	8:45321
CONF-8210133-	(8. All-Union conference on charged particles accelerators, Protvino, USSR, 1 Oct 1982)			
1	*See* JINR-9-82-423	DE83702115	MN -28	8:44539
CONF-8210136-	(Seminar and status report on wind energy, Juelich, F.R. Germany, 11-13 Oct 1982)			
	NTIS (US Sales Only), PC A23/MF A01; 1	DE83770001	MN -60	8:43671
CONF-821103-	(American Nuclear Society winter meeting, Washington, DC, USA, 14-19 Nov 1982)			
	Trans. Am. Nucl. Soc., 43: 56-57(1982)			8:44722
	Trans. Am. Nucl. Soc., 43: 393-394(1982)			8:45193
	Trans. Am. Nucl. Soc., 43: 395(1982)			8:45194
	Trans. Am. Nucl. Soc., 43: 396-397(1982)			8:45195
	Trans. Am. Nucl. Soc., 43: 397-398(1982)			8:45196
	Trans. Am. Nucl. Soc., 43: 398-399(1982)			8:45276
	Trans. Am. Nucl. Soc., 43: 383-384(1982)			8:45277
	Trans. Am. Nucl. Soc., 43: 384-385(1982)			8:45278
	Trans. Am. Nucl. Soc., 43: 385-387(1982)			8:45279
	Trans. Am. Nucl. Soc., 43: 387-388(1982)			8:45280
	Trans. Am. Nucl. Soc., 43: 390(1982)			8:45281
	Trans. Am. Nucl. Soc., 43: 390-393(1982)			8:45282
	Trans. Am. Nucl. Soc., 43: 399-400(1982)			8:45283
CONF-821179-	(2. international symposium on collection and experimental data processing and process control, Versailles, France, 3-5 Nov 1982)			
1	*See* JINR-R-10-82-368	DE83702097	MN -38	8:44388
CONF-8211101-	(International Association of Energy Economists meeting, Denver, CO, USA, 17-19 Nov 1982)			
1	NTIS, PC A03/MF A01; 1	DE83014330	MN -92	8:43293
CONF-8211102-	(North American Regional Science Association meeting, Pittsburgh, PA, USA, 14 Nov 1982)			
1	*See* PNL-SA-10893	DE83014647	MN -13	8:43989
CONF-8211103-	(International symposium on carbon, Toyohashi, Japan, 1-4 Nov 1982)			
1-Abst.	*See* LBL-14938	DE83015283	MN -25	8:44281
CONF-821244-	(Midterm workshop on Distributed Collector System (D.C.S.), Almeria, Spain, 8-11 Dec 1982)			
1	*See* CEA-CONF-6591	DE83750928	MN -62	8:43534
CONF-821246-	(US/Japan workshop on statistical physics and chaos in fusion plasmas, Austin, TX, USA, 13-17 Dec 1982)			
1	*See* PPPL-2001	DE83012428	STD -20g	8:45149
CONF-830143-	(Workshop on bosons in nuclei, Philadelphia, PA, USA, 28-29 Jan 1983)			
2	*See* BNL-33166	DE83014876	MN -34	8:45028
CONF-830145-	(ARO workshop on solid state switches for pulsed power, Tamarron, CO, USA, 12-14 Jan 1983)			
1	*See* UCRL-88536	DE83014841	MN -37	8:44454
CONF-830204-	(International beta dosimetry symposium, Washington, DC, USA, 15-18 Feb 1983)			
12	*See* DPSPU-83-30-3	DE83014366	MN -41	8:44789
CONF-830205-	(Waste management conference, Tucson, AZ, USA, 27 Feb-3 Mar 1983)			
32	*See* RHO-BW-SA-271P	DE83015079	MN -70	8:43378
CONF-830231-	(Europhysics study conference on electroweak effects at high energies, Erice, Italy, 1-10 Feb 1983)			
3	*See* FERMILAB-Conf-83/54-THY/EXP	DE83014780	MN -28	8:44921
CONF-830233-	(Conference on Monte Carlo methods in quantum problems, Orsay, France, 9-11 Feb 1983)			
1	NTIS, PC A02/MF A01	DE83014736	MN -34D	8:44358
CONF-830311-	(Particle accelerator conference, Santa Fe, NM, USA, 21-23 Mar 1983)			
182	NTIS, PC A02/MF A01	DE83014681	MN -28	8:44513
CONF-830323-	(15. biomass thermochemical conversion contractor's meeting, Atlanta, GA, USA, 16-17 Mar 1983)			
	See PNL-SA-11306	DE83013366	MN -61a	8:43425
CONF-830339-	(Theoretical symposium on intense medium energy sources of strangeness, Santa Cruz, CA, USA, 19-21 Mar 1983)			
3	*See* BNL-33259	DE83015052	MN -28	8:44510
4	*See* TRI-PP-83-45	DE83902880	MN -34D	8:44480

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830347-	(Atomic industrial forum fuel cycle conference, Kansas City, MO, USA, 20-23 Mar 1983)			
2	*See* DPSPU-83-30-4-Rev.	DE83012866	MN -70	8:43349
CONF-830358-	(Spring meeting of the Central States Section of the Combustion Institute, Lexington, KY, USA, 21-22 Mar 1983)			
23	*See* CSS/CI-83-06	DE83013389	MN -90d	8:43161
CONF-830374-	(Moriond conference on electroweak interactions, Les Arcs, France, 13-19 Mar 1983)			
1	*See* BNL-33263	DE83014770	MN -34D	8:44912
CONF-830375-	(Conference on geochemical behavior of disposed radioactive waste, Seattle, WA, USA, 20-25 Mar 1983)			
1	NTIS, PC A02/MF A01	DE83014348	MN -70	8:43393
CONF-830406-	(5. topical meeting on technology of fusion energy, Knoxville, TN, USA, 26-28 Apr 1983)			
63	NTIS, PC A02/MF A01	DE83012641	MN -20d	8:45199
CONF-830420-	(Society of Photo-Optical Instrumentation Engineers conference, Arlington, VA, USA, 4-8 Apr 1983)			
4	*See* SERI/TP-211-1952	DE83011978	STD -63	8:43508
CONF-830425-	(Society of Photo-Optical Instrumentation Engineers conference, Santa Fe, NM, USA, 11-15 Apr 1983)			
32	*See* LA-UR-83-1851	DE83014139	MN -4	8:44399
CONF-830439-	(3. multi-phase flow and heat transfer symposium, Miami, FL, USA, 18-20 Apr 1983)			
11	NTIS, PC A02/MF A01; 1	DE83014743	MN -91	8:43303
CONF-830446-	(American Power conference, Chicago, IL, USA, 18-20 Apr 1983)			
5	NTIS MF A01; 2	DE83014746	MN -97b	8:43725
CONF-830485-	(64. annual American Welding Society meeting, Philadelphia, PA, USA, 24-29 Apr 1983)			
3	*See* UCRL-87700	DE83014869	MN -20b	8:45262
CONF-8304104-	(Nordic winter school, Hemsedal, Norway, 1 Apr 1983)			
1	*See* LA-UR-83-1839	DE83013865	MN -34C	8:44930
CONF-8304105-	(6. international tandem conference, CHESTER, UK, 16-23 Apr 1983)			
1	*See* BNL-33218	DE83014443	MN -28	8:44509
CONF-830508-	(163. Electrochemical Society meeting, San Francisco, CA, USA, 8-13 May 1983)			
24	*See* SERI/TP-212-1970	DE83011977	STD -63	8:43509
CONF-830528-	(7. international symposium on packaging and transportation of radioactive materials, New Orleans, LA, USA, 15-20 May 1983)			
44	*See* SAND-82-1937C	DE83013991	MN -71	8:43334
45	*See* SAND-82-1952C	DE83015102	MN -71	8:43336
46	*See* SAND-82-1951C	DE83015100	MN -71	8:43335
CONF-830535-	(37. annual American Society for Quality Control congress, Boston, MA, USA, 24-26 May 1983)			
2	*See* EGG-M-02683	DE83015138	MN -80	8:43744
CONF-830563-	(Enlarged halden program group meeting, Loen, Norway, 23-28 May 1983)			
2	*See* EGG-M-09783	DE83015140	MN -80	8:43903
3	*See* EGG-M-09863	DE83015139	MN -80	8:43747
CONF-830566-	(ENERGY '83 symposium, San Francisco, CA, USA, 16-18 May 1983)			
4	NTIS, PC A02/MF A01	DE83014325	MN -13	8:43986
CONF-830576-	(Real-time computer applications in nuclear and particle physics conference, Berkeley, CA, USA, 16-20 May 1983)			
8	*See* LBL-15676	DE83014861	MN -32	8:44620
9	*See* LBL-16171	DE83014904	MN -32	8:44553
CONF-830577-	(Digital Equipment Computer Users Society (DECUS) symposium, St. Louis, MO, USA, 23-27 May 1983)			
3	*See* LA-UR-83-1808	DE83014151	MN -32	8:44552
CONF-830583-	(American Association for the Advancement of Science annual meeting, Detroit, MI, USA, 26-31 May 1983)			
3	NTIS, PC A02/MF A01; 1	DE83014337	MN -61	8:44049
CONF-830588-	(Delta-Nucleus dynamics symposium, Argonne, IL, USA, 2-4 May 1983)			
3	*See* LA-UR-83-1746	DE83014121	MN -46	8:44975
CONF-830589-	(10. National Organization for the Professional Advancement of Black Chemists and Chemical Engineers (NOBCCHE) annual meeting, Knoxville, TN, USA, 25-28 May 1983)			
2	*See* Y/DK-345	DE83013565	MN -4	8:44328
CONF-830591-	(Polarized ion workshop, Vancouver, Canada, 23-28 May 1983)			
2	*See* BNL-33273	DE83014764	MN -28	8:44512
3	*See* BNL-33272	DE83014763	MN -28	8:44511
CONF-830598-	(RCNP symposium on light ion reaction mechanism, Osaka, Japan, 16-20 May 1983)			
2	*See* UCRL-89336	DE83014842	MN -34C	8:44977
CONF-8305103-	(COMPUMAG conference on the computation of electromagnetic fields, Genoa, Italy, 30 May-2 Jun 1983)			
1	NTIS, PC A02/MF A01	DE83014717	MN -38	8:44440
2	NTIS, PC A02/MF A01; 1	DE83014734	MN -38	8:44441
CONF-8305104-	(Panamerican Transport Congress meeting, Buenos Aires, Argentina, 31 May-3 Jun 1983)			
1	NTIS, PC A02/MF A01	DE83014737	MN -96	8:44088

Report No.	Availability	Order No.	Distribution Category	Abstract No.
2	NTIS, PC A02/MF A01	DE83014738	MN -96	8:44089
CONF-8305105-	(International symposium on mini and microcomputers and their applications, San Francisco, CA, USA, 16-17 May 1983)			
1	*See* LBL-16042	DE83014900	MN -32	8:45304
CONF-830607-	(American Society of Mechanical Engineers pressure vessel and piping conference, Portland, OR, USA, 19-24 Jun 1983)			
16	*See* EGG-M-20082	DE83015142	MN -78	8:43906
17	*See* EGG-M-26182	DE83014965	MN -80	8:43907
18	*See* EGG-M-14682	DE83014920	MN -80	8:43904
19	*See* EGG-M-14882	DE83015445	MN -80	8:43905
CONF-830609-	(ANS annual meeting, Detroit, MI, USA, 12-17 Jun 1983)			
35	*See* EGG-M-28682	DE83015121	MN -80	8:43748
36	*See* EGG-M-08983	DE83015136	MN -80	8:43886
37	*See* EGG-M-01183	DE83015119	MN -80	8:43900
38	*See* EGG-M-01883	DE83015125	MN -80	8:43901
39	*See* EGG-M-30982	DE83015126	MN -80	8:43870
41	*See* EGG-M-01683	DE83014956	MN -70B	8:43351
42	*See* EGG-M-02283	DE83014957	MN -80	8:43902
CONF-830620-	(National Computer Graphics Association annual conference, Chicago, IL, USA, 26-30 Jun 1983)			
3	*See* EGG-M-06483	DE83015442	MN -32	8:45290
CONF-830621-	(IEEE power electronics specialists conference, Albuquerque, NM, USA, 6-9 Jun 1983)			
39	*See* UCRL-88639	DE83014941	MN -37	8:44455
CONF-830622-	(American Solar Energy Society meeting, Minneapolis, MN, USA, 1-3 Jun 1983)			
22	*See* SERI/TP-252-1922	DE83011966	STD -59a	8:43645
23	*See* SERI/TP-214-1976	DE83011968	STD -60	8:43678
CONF-830628-	(American control conference, San Francisco, CA, USA, 22-24 Jun 1983)			
7	*See* EGG-M-17282	DE83015120	MN -80	8:43869
CONF-830632-	(3. international conference on emerging nuclear energy systems, Helsinki, Finland, 6-9 Jun 1983)			
5	*See* UCRL-88872	DE83014950	MN -10	8:45263
6	*See* EGG-M-11183	DE83014954	MN -20f	8:45215
7	*See* BNL-33149	DE83015149	MN -80	8:43836
CONF-830642-	(5. international workshop on gases in strong rotation, Charlottesville, VA, USA, 6-9 Jun 1983)			
4	*See* LA-UR-83-1699	DE83014195	MN -34	8:44639
CONF-830650-	(FRG/US workshop on size reduction and decontamination facilities, Karlsruhe, F.R. Germany, 27-30 Jun 1983)			
2	*See* EGG-M-11783	DE83015444	MN -70	8:43352
CONF-830652-	(Automated non destructive evaluation conference, Idaho Falls, ID, USA, 28-30 Jun 1983)			
2	*See* EGG-M-11883	DE83015440	MN -70B	8:43353
3	*See* EGG-M-11983	DE83015441	MN -80	8:43820
CONF-830654-	(Gyrotron users/developers meeting, Germantown, MD, USA, 15 Jun 1983)			
	NTIS MF A01; 2	DE83015422	MN -20a	8:45200
CONF-830664-	(International gas research conference, London, UK, 13-16 Jun 1983)			
1	Institute of Gas Technology, 3424 South State Street, IIT Center, Chicago, IL 60618		MN -92	8:43297
4	Institute of Gas Technology, 3424 South State Street, IIT Center, Chicago, IL 60618		MN -61a	8:43422
CONF-830666-	(6. international conference on laser spectroscopy, Interlaken, Switzerland, 27 Jun-1 Jul 1983)			
3	NTIS, PC A02/MF A01	DE83014834	MN -34	8:44631
CONF-830670-	(International conference on subsurface heat storage in theory and practice, Stockholm, Sweden, 6-8 Jun 1983)			
1	*See* PNL-SA-11145	DE83013833	MN -94e	8:43974
2	*See* PNL-SA-10738	DE83014493	MN -94e	8:43973
CONF-830671-	(International symposium on gas transfer at water surface, Ithaca, NY, USA, 13-15 Jun 1983)			
1	NTIS, PC A02/MF A01; 1	DE83014057	MN -11	8:44729
CONF-830672-	(IEEE conference on modeling national economics, Washington, DC, USA, 17-19 Jun 1983)			
1	NTIS, PC A02/MF A01	DE83014745	MN -13	8:43987
CONF-830673-	(6. international congress and trade fair - laser 83 Opto-elektronik, Munich, F.R. Germany, 27 Jun-1 Jul 1983)			
1	*See* LBL-15381	DE83014862	MN -37	8:44619
CONF-830674-	(6. international Balaton topical conference on high energy nuclear physics, Balatonfured, Hungary, 6-11 Jun 1983)			
1	*See* LBL-16135	DE83014902	MN -34D	8:44931
CONF-830675-	(6. high energy heavy ion study and 2. workshop on anomalons, Berkeley, CA, USA, 28 Jun-1 Jul 1983)			
1	*See* LBL-16135	DE83014902	MN -34D	8:44931
2	*See* LBL-16197	DE83014903	MN -34D	8:44932
3	*See* LBL-16241	DE83014865	MN -34A	8:44880
CONF-830676-	(National Science Foundation workshop on long-range research opportunities for substituting non-metallic materials for vulnerable minerals, Washington, DC, USA, 27 Jun 1983)			
1	*See* EGG-M-09983	DE83015443	MN -25	8:44136

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830677-	(Conference on electronic excitations and interaction processes in organic molecular aggregates, Schlafi Elmau, F.R. Germany, 5-10 Jun 1983)			
1	*See* SAND-83-1300C	DE83015105	MN -25	8:44285
CONF-830680-	(International symposium on the structure and properties of crystal defects, Liblice, Czechoslovakia, 13-17 Jun 1983)			
1	*See* DOE/ER/01367-146	DE83014986	MN -25	8:44128
CONF-830709-	(24. annual meeting of the Institute of Nuclear Materials Management, Vail, CO, USA, 10-13 Jul 1983)			
18	*See* NLCO-1192	DE83014879	MN -16	8:43407
CONF-830710-	(7. international conference of radiation research, Amsterdam, Netherlands, 3-8 Jul 1983)			
3	NTIS, PC A02/MF A01	DE83014653	MN -48	8:44787
4	NTIS, PC A02/MF A01	DE83014654	MN -4	8:44359
CONF-830714-	(20. IEEE annual conference on nuclear and space radiation effects, Gatlinburg, TN, USA, 18-21 Jul 1983)			
6	*See* SAND-83-1433C	DE83013990	MN -37	8:44628
9	*See* SAND-83-0653C	DE83013993	MN -37	8:44627
10	*See* SAND-83-1601C	DE83015112	MN -37	8:44393
CONF-830719-	(Topical conference on shock waves in condensed media, Santa Fe, NM, USA, 18-21 Jul 1983)			
2	*See* SAND-83-0697C	DE83014611	MN -25	8:44284
5	*See* UCRL-88901	DE83015455	MN -34A	8:44201
6	*See* SAND-83-0536C	DE83015207	MN -4	8:44351
7	*See* SAND-83-0801C	DE83015206	MN -38	8:44196
8	*See* SAND-83-0772C	DE83015205	MN -25	8:44195
12	*See* SAND-83-0537C	DE83015189	MN -34A	8:45066
CONF-830763-	(9. AIRAPT conference, Albany, NY, USA, 25-29 Jul 1983)			
1	*See* LA-UR-83-1854	DE83014140	MN -34	8:44327
2	*See* SAND-83-1608C	DE83014779	MN -25	8:44197
CONF-830766-	(Meeting of experts on anthropogenic climatic change, Leningrad, USSR, 4-10 Jul 1983)			
1	*See* UCRL-89161	DE83014948	MN -11	8:44815
CONF-830767-	(Symposium on erosion and sedimentation, Ft. Collins, CO, USA, 27-29 Jul 1983)			
1	*See* SAND-83-0672C	DE83015107	MN -11	8:44814
CONF-830768-	(9. International Association for the Advancement of High Pressure Science and Technology conference, Albany, NY, USA, 25-28 Jul 1983)			
1	*See* UCRL-88635	DE83014844	MN -34A	8:44199
CONF-830769-	(2. annual conference on hardened electronics and radiation technology, Oak Ridge, TN, USA, 21-22 Jul 1983)			
1	*See* SAND-83-0479C	DE83015103	MN -84	8:44626
CONF-830802-	(International Union of Theoritical and Applied Mechanics symposium on atmospheric disperation of heavy gases and small particles, Delft, Netherlands, 28 Aug 1983)			
1	*See* UCRL-88516	DE83006612	MN -11	8:44693
CONF-830806-	(1. international symposium on rock fragmentation by blasting, Lulea, Sweden, 23-26 Aug 1983)			
1	*See* LA-UR-83-399	DE83007555	MN -11	8:43302
CONF-830809-	(Symposium on phenolics revisited, Washington, DC, USA, 28 Aug-2 Sep 1983)			
2	*See* BDX-613-2920	DE83008315	MN -38	8:44450
CONF-830812-	(18. intersociety energy conversion engineering conference, Orlando, FL, USA, 21-26 Aug 1983)			
37	*See* BNL-33058	DE83015051	MN -77	8:43818
CONF-830816-	(International meeting on light-water reactor severe accident evaluation, Cambridge, MA, USA, 28 Aug-1 Sep 1983)			
5	*See* SAND-83-0443C	DE83015208	MN -78	8:43950
CONF-830827-	(9. annual symposium on underground coal gasification, Bloomingdale, IL, USA, 7-10 Aug 1983)			
1	*See* UCRL-89010	DE83015454	MN -90c	8:43186
CONF-830841-	(Cryogenic engineering conference and international cryogenic materials conference, Colorado Springs, CO, USA, 15-19 Aug 1983)			
1	*See* SLAC-PUB-3143	DE83015086	MN -38	8:44434
CONF-830862-	(10. international conference on few-body problems in physics, Karlsruhe, F.R. Germany, 21-27 Aug 1983)			
1	NTIS, PC A02/MF A01	DE83014711	MN -34C	8:44969
CONF-830874-	(27. annual international technical symposium on high speed photography, videography and photonics, San Diego, CA, USA, 21-26 Aug 1983)			
6	*See* DOE/DP/40152-T1	DE83014833	MN -21	8:45214
7	*See* UCRL-88917	DE83014943	MN -37	8:44645
CONF-830883-	(2. international ORACLE user group conference, Boston, MA, USA, 14-17 Aug 1983)			
1	*See* UCRL-89396	DE83014952	MN -21	8:45265
2	*See* UCRL-89016	DE83014947	MN -21	8:45264
CONF-830887-	(Joint meeting of American Crystallographic Association and Denver X-ray conference, Snowmass, CO, USA, 1 Aug 1983)			
1	*See* LA-UR-83-1724	DE83014118	MN -25	8:44172
CONF-830888-	(5. international conference on liquid and amorphous metals, Los Angeles, CA, USA, 15-19 Aug 1983)			
1	*See* UCRL-88870	DE83015058	MN -34A	8:44200

Report No.	Availability	Order No.	Distribution Category	Abstract No.
CONF-830889-	(NATO Advanced Study Institute on statistical extremes and applications, Vimeiro, Portugal, 31 Aug-14 Sep 1983)			
1	*See* UCRL-86245	DE83014845	MN -80	8:43952
CONF-8309111-	(5. annual international computervision user conference, Miami Beach, FL, USA, 13-16 Sep 1983)			
2	*See* UCRL-89383	DE83014839	MN -32	8:45317
COO-				
1195-485	*See* DOE/ER/01195-485	DE83014728	MN -34D	8:44920
1367-146	*See* DOE/ER/01367-146	DE83014986	MN -25	8:44128
2566-24	NTIS, PC A02/MF A01	DE83014894	MN -96	8:43978
3131-4	*See* DOE/ER/53131-4	DE83015116	MN -20a	8:45098
CSS/CI-				
83-06	NTIS MF A01; 2	DE83013389	MN -90d	8:43161
CTA-EAV-NT-				
011/ 82	NTIS (US Sales Only), PC A03/MF A01	DE83702098	MN -28	8:44469
CTH-IE-T-				
82-104	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750767	MN -90e	8:43261
CW-WR-				
76-015.49A	NTIS, PC A04/MF A01; 1	DE82004275	STD -90e	8:44461
DE-				
83011967	*See* SERI/STR-231-1860	DE83011967	STD -62e	8:43651
DESY-				
82-058	NTIS (US Sales Only), PC AXX/MF A01	DE83750211	MN -34D	8:44915
82-060	NTIS (US Sales Only), PC A02/MF A01	DE83750210	MN -34D	8:44916
82-086	NTIS (US Sales Only), PC A02/MF A01	DE83750904	MN -34D	8:44917
83-002	NTIS (US Sales Only), PC A02/MF A01	DE83750903	MN -34D	8:44918
83-080	NTIS (US Sales Only), PC A02/MF A01	DE83750902	MN -34D	8:44919
DESY-L-Trans-				
270	NTIS (US Sales Only), PC A02/MF A01	DE83780991	MN -34	8:45054
DFVLR-FB-				
82-15	NTIS (US Sales Only), PC A05/MF A01	DE83751154	MN -25	8:44257
DLCS-				
5000183	NTIS, PC A02/MF A01	DE83015551	MN -78	8:43764
DOE/BC/10116-				
20	NTIS, PC A12/MF A01; 1	DE83015636	STD -92a	8:43270
DOE/BP-				
143	NTIS, PC A15/MF A01; 1	DE83014183	MN -95e	8:44108
DOE/CE-				
0033-1	NTIS, PC A19/MF A01	DE83014927	STD -63	8:43491
DOE/CE/40590-				
T1	NTIS, PC A03/MF A01; 1	DE83008147	MN -95f	8:44094
DOE/CS/15013-				
T1	NTIS, PC A02/MF A01	DE83011612	MN -95f	8:44095
DOE/CS/20531-				
T1	NTIS, PC A04/MF A01; 1	DE83015065	MN -95d	8:44068
T2	NTIS MF A01; 2	DE83015067	MN -95d	8:44069
T3	NTIS, PC A02/MF A01	DE83015063	MN -95d	8:44070
T4	NTIS, PC A04/MF A01	DE83015064	MN -95d	8:44071
T5	NTIS, PC A05/MF A01; 1	DE83015069	MN -95d	8:44072
T6	NTIS, PC A05/MF A01; 1	DE83015066	MN -95d	8:44073
DOE/CS/22804-				
2	NTIS, PC A13/MF A01; 1	DE83015723	MN -95d	8:44074
DOE/CS/24416-				
T1	NTIS, PC A09/MF A01; 1	DE83013984	MN -13	8:44109
T2	NTIS, PC A06/MF A01; 1	DE83014269	MN -13	8:44110
DOE/CS/24436-				
T1	NTIS, PC A06/MF A01; 1	DE83015155	MN -98G	8:44032
DOE/CS/28701-				
T1	NTIS, PC A05/MF A01; 1	DE83008150	MN -95d	8:44075
DOE/CS/30211-				
01	NTIS, PC A12/MF A01; 1	DE83008314	STD -59	8:43638
DOE/CS/30607-				
T1	NTIS, PC A03; 3	DE83014724	ND -59	8:44050
DOE/CS/40240-				
T1	NTIS MF A01; 2	DE83014470	MN -95d	8:44076
DOE/CS/51294-				
01	NTIS, PC A20/MF A01; 1	DE83014921	STD -96	8:44124
01-Annex-A	NTIS, PC A03/MF A01; 1	DE83014922	STD -96	8:44125
DOE/CS/64571-				
T2	NTIS, PC A03/MF A01	DE83014589	STD -95	8:44060
DOE/DP/00539-				
049	NTIS, PC A03/MF A01	DE83014799	MN -11	8:44696
DOE/DP/40124-				
6	NTIS, PC A04/MF A01	DE83014837	MN -21	8:45212
DOE/DP/40133-				
1	NTIS, PC A09/MF A01	DE83015439	MN -21	8:45213
DOE/DP/40152-				
T1	NTIS, PC A02/MF A01; 1	DE83014833	MN -21	8:45214
DOE/EIA-				
0125(83/ 1Q)	NTIS, PC A05/MF A01; 1	DE83015264	MN -98A	8:44035
0167(82) P	NTIS, PC A02/MF A01	DE83014999	MN -98B	8:43292
0202(83/ 2Q) -1	NTIS, PC A03/MF A01; 1	DE83014722	MN -98	8:44027
0380(83/ 06)	NTIS, PC A05/MF A01; 1	DE83015425	MN -98B	8:43285
0395	NTIS, PC A09/MF A01; 1	DE83015194	MN -98B	8:44036
0398	NTIS, PC A04/MF A01; 1	DE83015427	MN -98B	8:44037

Report No.	Availability	Order No.	Distribution Category	Abstract No.
0412	NTIS, PC A08/MF A01; 1	DE83015397	MN -98B	8:44038
DOE/ER/01195-485	NTIS, PC A07/MF A01	DE83014728	MN -34D	8:44920
DOE/ER/01367-146	NTIS, PC A02/MF A01	DE83014986	MN -25	8:44128
DOE/ER/03158-108	NTIS, PC A04/MF A01; 1	DE83015037	MN -25	8:44129
DOE/ER/03230-T2	NTIS, PC A02/MF A01	DE83013962	MN -34D	8:44911
DOE/ER/03518-105	NTIS, PC A03/MF A01	DE83014981	MN -25	8:44130
107	NTIS, PC A02/MF A01	DE83014982	MN -25	8:44131
DOE/ER/04996-4	NTIS, PC A05/MF A01	DE83015026	MN -63e	8:43646
DOE/ER/04998-T2	NTIS, PC A02/MF A01; 1	DE83015382	MN -25	8:44262
T3	NTIS, PC A02/MF A01	DE83015572	MN -25	8:44243
DOE/ER/06034-T7	NTIS, PC A04/MF A01	DE83014996	MN -4	8:44334
DOE/ER/06036-T1	NTIS, PC A06/MF A01; 1	DE83008776	MN -34	8:44838
DOE/ER/10362-T2	NTIS, PC A02/MF A01	DE83015576	MN -4	8:44348
DOE/ER/10457-4	NTIS, PC A02/MF A01; 1	DE83015192	MN -61	8:44356
DOE/ER/10603-T2	NTIS, PC A02/MF A01; 1	DE83014962	MN -25	8:44349
DOE/ER/10641-1	NTIS, PC A02/MF A01	DE83013717	MN -4	8:44350
DOE/ER/10653-T1	NTIS, PC A09/MF A01; 1	DE83010915	STD -61a	8:43451
DOE/ER/10750-T1	NTIS, PC A02/MF A01	DE83015035	MN -28	8:45063
DOE/ER/10759-3	NTIS, PC A04/MF A01	DE83015573	MN -28	8:44514
DOE/ER/10766-T2	NTIS, PC A02/MF A01; 1	DE83015025	MN -11	8:44726
DOE/ER/10960-3	NTIS, PC A02/MF A01	DE83015331	MN -25	8:44132
DOE/ER/53131-4	NTIS, PC A06/MF A01; 1	DE83015116	MN -20a	8:45098
DOE/ER/53140-9	NTIS, PC A02/MF A01	DE83015193	MN -20g	8:45099
DOE/ER/60000-T1	NTIS, PC A02/MF A01; 1	DE83015577	MN -11	8:44742
DOE/ER/60029-2	NTIS, PC A02/MF A01; 1	DE83014827	MN -11	8:44766
DOE/ER/60063-1	NTIS, PC A03/MF A01	DE83014628	MN -34	8:44324
DOE/ER/70294-T1	NTIS, PC A04/MF A01	DE83012085	MN -25	8:44133
DOE/ER/71001-T1	NTIS, PC A02/MF A01	DE83014577	MN -34D	8:44974
DOE/ES-0003/ 1	NTIS, PC A03/MF A01	DE83015054	MN -2	8:43743
DOE/ET/10204-1401	NTIS, PC A16/MF A01; 1	DE83013060	STD -90c	8:43162
DOE/ET/10373-T10	NTIS, PC A15/MF A01; 1	DE83014877	STD -90i	8:43212
DOE/ET/10386-T1-Vol.2	NTIS, PC A15/MF A01; 1	DE81030265	STD -90e	8:43224
DOE/ET/10415-T6	NTIS, PC A07/MF A01	DE83012575	STD -90e	8:44096
DOE/ET/10617-T1	NTIS, PC A06/MF A01	DE83015348	MN -90c	8:43163
DOE/ET/11304-T8	NTIS, PC A05/MF A01	DE83014972	MN -93	8:44055
DOE/ET/12478-T1	NTIS, PC A09/MF A01; 1	DE82002424	STD -88	8:43248
DOE/ET/14882-1412	NTIS, PC A14/MF A01	DE83012279	STD -90c	8:43164
DOE/ET/14928-1437	NTIS, PC A04/MF A01; 1	DE83015281	STD -90c	8:43165
1438	NTIS, PC A06/MF A01; 1	DE83015282	STD -90c	8:43166
DOE/ET/15426-T25	NTIS, PC A12/MF A01; 1	DE83013483	STD -95f	8:44464
DOE/ET/20218-T1	NTIS, PC A02/MF A01; 1	DE83015057	MN -63c	8:43492
DOE/ET/20597-T11	NTIS, PC A19/MF A01; 1	DE83008706	MN -61a	8:43493
DOE/ET/20624-T4	NTIS, PC A02/MF A01; 1	DE83014751	MN -63b	8:43529
DOE/ET/34031-13	NTIS (US Sales Only), PC A05/MF A01	DE83015327	STD -78	8:43745

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/ET/51013-80	NTIS, PC A08/MF A01	DE83015424	MN -20f	8:45100
DOE/ET/53004-51	NTIS, PC A09/MF A01; 1	DE83015594	STD -20f	8:45101
DOE/ET/53088-96	NTIS, PC A03/MF A01	DE83014884	MN -20f	8:45102
DOE/EV-0005/ 39	NTIS, PC A06/MF A01	DE83015739	STD -70A	8:44697
DOE/EV/03221-80	NTIS, PC A03/MF A01	DE83014719	MN -48	8:44758
DOE/EV/04568-35	NTIS, PC A02/MF A01	DE83015031	MN -48	8:44788
DOE/EV/04625-T3	NTIS, PC A03/MF A01	DE83014765	MN -48	8:44767
DOE/EV/10673-T1	NTIS, PC A02/MF A01	DE83015268	MN -34C	8:44567
T2	NTIS, PC A02/MF A01	DE83015150	MN -34C	8:44568
DOE/FC/10182-T15	NTIS MF A01; 2	DE83014539	STD -90i	8:43213
DOE/FE/05147-T16	NTIS, PC A06/MF A01; 1	DE83011697	MN -90c	8:43167
T17	NTIS, PC A04/MF A01; 1	DE83011720	MN -90c	8:43168
DOE/FE/15081-1	NTIS MF A01; 2	DE83013637	STD -90i	8:43214
T1	NTIS, PC A08/MF A01; 1	DE83013883	STD -90i	8:43215
DOE/FE/60173-T1	NTIS, PC A04/MF A01	DE83014595	MN -13	8:43283
DOE/GJ/01664-T4	NTIS PC E08/MF $12.50; 1	DE83011310	MN -51	8:43312
DOE/ID/01756-2	NTIS, PC A07/MF A01; 1	DE83015294	MN -66g	8:43660
DOE/IG-0195	USDOE-TIC, PO Bx 62, Oak Ridge, TN 37830		STD -32	8:45289
DOE/IR/10321-T1	NTIS, PC A02/MF A01	DE83014234	MN -25	8:44134
DOE/JPL/955567-83-11	NTIS, PC A03/MF A01; 1	DE83015463	STD -63b	8:43494
DOE/JPL/955909-83/ 10	NTIS, PC A03/MF A01	DE83014438	STD -63b	8:43495
DOE/JPL/956205-83/ 4	NTIS, PC A02/MF A01; 1	DE83015172	STD -63b	8:43496
DOE/MC/08383-45-Vol.1	NTIS, PC A13/MF A01; 1	DE83015381	STD -92a	8:43271
45-Vol.2	NTIS, PC A18/MF A01; 1	DE83015380	STD -92a	8:43272
DOE/MC/10737-1436	NTIS, PC A15/MF A01; 1	DE83015280	STD -88	8:43249
DOE/MC/10865-13	NTIS, PC A11/MF A01	DE83015360	STD -92a	8:43273
DOE/MC/14273-1411	NTIS, PC A06/MF A01; 1	DE83011405	STD -89	8:43169
DOE/MC/14373-T1	NTIS, PC A02/MF A01; 1	DE83015812	MN -11	8:44664
DOE/MC/14593-1416	NTIS, PC A06/MF A01	DE83013078	STD -90c	8:43170
DOE/MC/14705-1429	NTIS, PC A14/MF A01	DE83014381	STD -90c	8:43171
1430	NTIS, PC A12/MF A01; 1	DE83014634	STD -90c	8:43172
DOE/MC/16049-T7	NTIS, PC A02/MF A01	DE83011874	MN -90i	8:43216
DOE/MC/16221-T2	NTIS, PC A03/MF A01; 1	DE81028604	MN -90a	8:43191
DOE/MC/16441-1423	NTIS, PC A06/MF A01	DE83014550	STD -90i	8:43217
DOE/MC/16547-1420	NTIS, PC A05/MF A01; 1	DE83013576	STD -90i	8:43218
DOE/MC/19239-1422	NTIS, PC A04/MF A01; 1	DE83015129	STD -92a	8:43295
DOE/MC/19403-2	NTIS, PC A03/MF A01	DE83012608	MN -90c	8:43173
DOE/NASA/0175-1-Vol.1	NTIS, PC A04/MF A01; 1	DE83015272	STD -90d	8:43174
1-Vol.2	NTIS, PC A07/MF A01; 1	DE83015273	STD -90d	8:43175
1-Vol.3	NTIS MF A01; 2	DE83015274	MN -90d	8:43176
1-Vol.4	NTIS, PC A06/MF A01; 1	DE83015275	STD -90d	8:43177
DOE/NASA/0210-1	NTIS, PC A03/MF A01; 1	DE83014588	STD -90	8:44056
DOE/NASA/0287-1	NTIS, PC A03/MF A01; 1	DE83015325	STD -96	8:44127
DOE/NASA/3194-1	NTIS, PC A18/MF A01; 1	DE83015181	STD -96	8:44123
DOE/NASA/9235-75/ 2	NTIS MF A01; 2	DE83014895	STD -60	8:43706
DOE/NASA/12726-20	NTIS, PC A02/MF A01	DE83015307	STD -94cb	8:44057

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DOE/NASA/51044-30	NTIS, PC A02/MF A01	DE83015308	STD -96	8:44126
DOE/NBB-0037	NTIS, PC A09/MF A01; 1	DE83015328	STD -11	8:44710
DOE/NBM-3015045	NTIS, PC A12/MF A01	DE83015045	MN -97	8:44028
3015565	National Petroleum Council, 1625 K Street, N.W., Washington, DC 20006		ND -98B	8:44039
DOE/NE-0051	NTIS, PC A19/MF A01	DE83015423	STD -78	8:43827
0052	NTIS, PC A18/MF A01; 1	DE83015326	STD -78	8:43828
DOE/NE/33080-T1	NTIS, PC A05/MF A01	DE83015458	MN -34A	8:44263
DOE/NE/37900-1	NTIS, PC A03/MF A01; 1	DE83015652	MN -79h	8:43801
2	NTIS, PC A03/MF A01; 1	DE83015651	MN -25	8:44135
3	NTIS, PC A03/MF A01; 1	DE83015655	MN -79h	8:43802
DOE/NV/10162-4	NTIS, PC A03/MF A01; 1	DE83014883	MN -11	8:44720
5	NTIS, PC A03/MF A01; 1	DE83015303	MN -70	8:44711
7	NTIS, PC A04/MF A01; 1	DE83014882	MN -70	8:43343
8	NTIS, PC A05/MF A01	DE83014881	MN -70	8:44721
9	NTIS, PC A02/MF A01	DE83014880	MN -70	8:44712
DOE/OR/00033-T6	NTIS, PC A04/MF A01	DE83015147	MN -88	8:43250
T25	NTIS, PC A02/MF A01	DE83015196	MN -13	8:45287
DOE/PC/30022-2	NTIS MF A01; 2	DE81027500	STD -90d	8:43423
DOE/PETC/QTR-83/ 2	NTIS, PC A05/MF A01	DE83015050	STD -90d	8:43178
DOE/PR/06010-T32	NTIS, PC A02/MF A01	DE83014022	MN -20	8:45103
DOE/R5/10299-T2	NTIS, PC A02/MF A01; 1	DE83014673	MN -95d	8:44113
T3	NTIS, PC A02/MF A01; 1	DE83014857	MN -95d	8:44114
DOE/R5/10325-T1	NTIS, PC A03/MF A01; 1	DE83015266	MN -62a	8:43639
T2	NTIS, PC A03/MF A01; 1	DE83014926	MN -62a	8:43640
DOE/RA-23215	NTIS, PC A04/MF A01; 1	DE83015148	STD -97e	8:43475
DOE/RA/23214-1	NTIS, PC A03/MF A01; 1	DE83015309	STD -97e	8:43476
DOE/RA/50156-T1	NTIS, PC A03/MF A01	DE83014657	MN -97a	8:44451
DOE/RG/10446-T3	NTIS, PC A10; 3	DE81023084	ND -98F	8:43262
DOE-RW-82.049	*See* AEEW-R-1534		ND -70	8:43339
82-063	*See* AERE-R-10388	DE83702198	MN -70	8:43340
DOE/S-0020/ 1	NTIS, PC A04/MF A01	DE83014886	MN -70	8:43344
DOE/SF/00515-T10	NTIS, PC A02/MF A01; 1	DE83015333	MN -28	8:44515
T11	NTIS MF A01; 2	DE83015341	MN -28	8:44516
T12	NTIS, PC A02/MF A01; 1	DE83015338	MN -28	8:44517
T13	NTIS, PC A02/MF A01; 1	DE83015335	MN -28	8:44518
T15	NTIS, PC A02/MF A01; 1	DE83015334	MN -28	8:44519
T16	NTIS MF A01; 2	DE83015332	MN -28	8:44520
DOE/SF/11549-T1	NTIS, PC A03/MF A01	DE83015167	MN -98	8:44051
DOE/SF/90506-1	NTIS, PC A12/MF A01	DE83014527	STD -62d	8:43535
DOE/SR/00952-T1	NTIS, PC A06/MF A01; 1	DE83015552	MN -83	8:43746
T2	NTIS, PC A07/MF A01; 1	DE83015556	MN -83	8:43329
T3	NTIS, PC A08/MF A01; 1	DE83015582	MN -83	8:43330
T4	NTIS, PC A08/MF A01; 1	DE83015555	MN -83	8:43309
T5	NTIS, PC A20/MF A01; 1	DE83015146	MN -83	8:43829
T6	NTIS, PC A13/MF A01; 1	DE83015186	MN -83	8:43401
T7	NTIS, PC A06/MF A01; 1	DE83015187	MN -83	8:43345
T8	NTIS, PC A06/MF A01; 1	DE83015544	MN -83	8:43402
T9	NTIS, PC A09/MF A01; 1	DE83015543	MN -83	8:43394
T10	NTIS, PC A07/MF A01; 1	DE83015542	MN -83	8:43830
DOE/UMT-0064	NTIS, PC A04/MF A01	DE83015176	MN -70	8:43346
0263	NTIS, PC A07/MF A01; 1	DE83015420	MN -70A	8:43347
0265	NTIS, PC A02/MF A01	DE83014810	STD -70A	8:43348
DP-MS-83-7	NTIS, PC A03/MF A01	DE83015405	MN -37	8:44569
DPSPU-83-30-3	NTIS MF A01; 2	DE83014366	MN -41	8:44789
83-30-4-Rev.	NTIS, PC A02/MF A01	DE83012866	MN -70	8:43349
DSN-559	NTIS (US Sales Only), PC A03/MF A01	DE83702072	MN -41	8:43875

Report No.	Availability	Order No.	Distribution Category	Abstract No.
DTH-LET-NE-				
82-1(Pt.1)	NTIS (US Sales Only), PC A09/MF A01; 1	DE83750758	MN -38	8:44465
82-1(Pt.2)	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750759	MN -38	8:44466
82-1(Pt.3)	NTIS (US Sales Only), PC A08/MF A01; 1	DE83750760	MN -38	8:44467
EDFB/IBP-				
77/ 5	NTIS, PC A03/MF A01	DE83014893	MN -11	8:44713
EFI-				
503(46) -81	NTIS (US Sales Only), PC A02/MF A01	DE83702859	MN -20	8:45104
EFN-AES-				
1982-1	NTIS (US Sales Only), PC A04/MF A01	DE83750854	MN -61a	8:44029
EGG-				
2208	NTIS, PC A05/MF A01; 1	DE83014808	STD -66d	8:43662
2258	*See* NUREG/CR-3289	DE83014939	MN -80	8:43873
2262	NTIS, PC A08/MF A01; 1	DE83015665	MN -70	8:43350
2265	NTIS MF A01; 2	DE83014960	MN -12	8:44097
M-11983	NTIS, PC A02/MF A01	DE83015441	MN -80	8:43820
EGG-M-				
01183	NTIS, PC A02/MF A01	DE83015119	MN -80	8:43900
01683	NTIS, PC A02/MF A01	DE83014956	MN -70B	8:43351
01883	NTIS, PC A02/MF A01	DE83015125	MN -80	8:43901
02283	NTIS, PC A02/MF A01	DE83014957	MN -80	8:43902
02683	NTIS, PC A02/MF A01; 1	DE83015138	MN -80	8:43744
06483	NTIS, PC A02/MF A01; 1	DE83015442	MN -32	8:45290
08983	NTIS, PC A02/MF A01	DE83015136	MN -80	8:43886
09783	NTIS, PC A02/MF A01; 1	DE83015140	MN -80	8:43903
09883	NTIS, PC A02/MF A01; 1	DE83015139	MN -80	8:43747
09983	NTIS, PC A02/MF A01	DE83015443	MN -25	8:44136
11183	NTIS, PC A02/MF A01	DE83014954	MN -20f	8:45215
11783	NTIS, PC A02/MF A01	DE83015444	MN -70	8:43352
11883	NTIS, PC A02/MF A01; 1	DE83015440	MN -70B	8:43353
14682	NTIS, PC A02/MF A01; 1	DE83014920	MN -80	8:43904
14882	NTIS, PC A02/MF A01	DE83015445	MN -80	8:43905
17282	NTIS, PC A02/MF A01	DE83015120	MN -80	8:43869
20082	NTIS, PC A03/MF A01; 1	DE83015142	MN -78	8:43906
26182	NTIS, PC A02/MF A01	DE83014965	MN -80	8:43907
28682	NTIS, PC A02/MF A01	DE83015121	MN -80	8:43748
30982	NTIS, PC A02/MF A01	DE83015126	MN -80	8:43870
EGG-WM-F-				
1-83-018	NTIS, PC A02/MF A01; 1	DE83014636	MN -70	8:43354
EMD-				
2-68-1108	*See* NP-3902856		MN -95d	8:44084
EML-				
415	NTIS, PC A05/MF A01; 1	DE83015310	STD -11	8:44716
EPA-				
450/ 3-83-011a	NTIS		MN -11	8:44755
450/ 5-82-005	Environmental Protection Agency, Research Triangle Park, NC 27711		MN -11	8:44665
600/ 3-83-040	*See* DOE/DP/00539-049	DE83014799	MN -11	8:44696
EPRI-AP-				
2884-SR	NTIS, PC A11/MF A01; 1	DE83901829	MN -60	8:43536
3006	NTIS, PC A99/MF A01; 1	DE83013068	MN -90c	8:43225
EPRI-EL-				
2835-Vol.4	NTIS, PC A08/MF A01; 1	DE83902598	MN -97c	8:44042
3106-Vol.3	NTIS, PC A03/MF A01; 1	DE83902594	MN -97a	8:43298
EPRI-NP-				
3062	NTIS, PC A04/MF A01	DE83902588	MN -25	8:44137
ER-				
81-2E	NTIS (US Sales Only), PC A16/MF A01	DE83780850	MN -51	8:44018
ESC-				
1	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770217	MN -94b	8:43970
5	NTIS (US Sales Only), PC A12/MF A01; 2	DE83770219	MN -95	8:44115
5SAM	NTIS (US Sales Only), PC A04/MF A01; 1	DE83770220	MN -95	8:44116
16	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770230	MN -95d	8:44077
17	NTIS (US Sales Only), PC A10/MF A01	DE83770211	MN -98F	8:44030
18	NTIS (US Sales Only), PC A06/MF A01	DE83770221	MN -97e	8:43542
20	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770231	MN -95d	8:44117
21	NTIS (US Sales Only), PC A04/MF A01; 1	DE83770212	MN -95d	8:44098
ESC-WR-				
82-04	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -95	8:44118
82-05	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -97d	8:44043
82-06	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -11	8:44006
82-08	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -98	8:43984
82-11	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -13	8:43988

Report No.	Availability	Order No.	Distribution Category	Abstract No.
82-12	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -98E	8:44046
82-13	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -95	8:44007
82-14	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -88	8:43243
82-15	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -98G	8:44099
82-23	Stichting Energieonderzoek Centrum Nederland (ECN), Bureau Energie Onderzoek Projecten (BEOP), Petten, Netherlands		MN -97d	8:44019
EUR-				
7281-EN-Annex	European Community Information Service, (ECIS), 2100 M Street NW, Suite 707, Washington, DC 20037		ND -95f	8:44078
7897-FR	Available from Commission of the European Communities, Luxembourg			8:44011
8199-EN	European Community Information Service (ECIS), 2100 M Street NW, Suite 707, Washington, DC 20037		ND -63	8:43500
8358-EN	European Community Information Service (ECIS), 2100 M Street NW, Suite 707, Washington, DC 20037		ND -96	8:44121
8370-EN/ FR	European Community Information Service, 2100 M Street NW, Suite 707, Washington, DC 8629500		ND -95d	8:44079
8461-FR	European Community Information Service, 2100 M Street, NW, Suite 707, Washington, DC 20037		ND -95d	8:44080
8507-EN	ECIS, 2100 M Street N.W., Suite 707, Washington, DC 20037		ND -94d	8:43420
FCR-				
4294	*See* DOE/NASA/0210-1	DE83014588	STD -90	8:44056
FE-				
1726-49A	*See* CW-WR-76-015.49A	DE82004275	STD -90e	8:44461
2346-8	NTIS, PC A03/MF A01; 1	DE83015549	STD -91	8:43304
2408-14	*See* DOE/ET/10617-T1	DE83015348	MN -90c	8:43163
9061-1	*See* DOE/ET/12478-T1	DE82002424	STD -88	8:43248
FEI-				
1158	NTIS (US Sales Only), PC A02/MF A01	DE83702089	MN -38	8:43803
1229	NTIS (US Sales Only), PC A02/MF A01	DE83702086	MN -23	8:45002
1251	NTIS (US Sales Only), PC A02/MF A01	DE83702090	MN -38	8:43862
1252	NTIS (US Sales Only), PC A02/MF A01	DE83702091	MN -38	8:43863
1254	NTIS (US Sales Only), PC A02/MF A01	DE83702133	MN -80	8:43839
1257	NTIS (US Sales Only), PC A02/MF A01	DE83702153	MN -79	8:43908
1261	NTIS (US Sales Only), PC A02/MF A01	DE83702092	MN -38	8:43854
1268	NTIS (US Sales Only), PC A02/MF A01	DE83702140	MN -80	8:43765
1275	NTIS (US Sales Only), PC A02/MF A01	DE83702134	MN -80	8:43766
1294	NTIS (US Sales Only), PC A02/MF A01	DE83702135	MN -80	8:43840
FERMILAB-Conf-				
83/ 54-THY/ EXP	NTIS, PC A02/MF A01; 1	DE83014780	MN -28	8:44921
FFA-TN-				
1982-19	*See* NE-VIND-82-45	DE83750782	MN -60	8:43716
FHWA/RD-				
82/ 167	NTIS, PC A07/MF A01; 1	DE83014355	MN -96	8:44100
FIAS-R-				
106	NTIS (US Sales Only), PC A02/MF A01	DE83701057	MN -34A	8:44839
FOA-C-				
20443-T1	NTIS (US Sales Only), PC A03/MF A01	DE83902605	MN -35	8:44653
FRNC-TH-				
1077	NTIS (US Sales Only), PC A10/MF A01	DE83780928	MN -78	8:43767
FWS/OBS-				
82/ 03	Dept. of the Interior, Fish and Wildlife Services, Div. of Biological Services, Washington, DC 20240		MN -11	8:43286
GA-				
A16992	NTIS, PC A06/MF A01	DE83015293	MN -80	8:43819
GA-A-				
17000	NTIS, PC A06/MF A01; 1	DE83014929	STD -77	8:43909
GEFR-				
00622	NTIS, PC A06/MF A01; 1	DE83015313	STD -77	8:43833
GEND-INF-				
11-Vol.3	NTIS, PC A03/MF A01	DE83014875	MN -78	8:43910
GJBX-				
17(83)	NTIS, PC A03/MF A01; 1	DE83015402	MN -51	8:43313
30(83)	NTIS PC E05/MF A01;	DE83014853	MN -51	8:43325
31-83-Vol.1	NTIS PC E10/MF $14.75; 1	DE83014852	MN -51	8:43314
31-83-Vol.2A-DA	NTIS MF A01; 2	DE83014873	MN -51	8:43319
31-83-Vol.2A-DB	NTIS MF A01; 2	DE83014823	MN -51	8:43323
31-83-Vol.2A-DC	NTIS MF A01; 2	DE83014824	MN -51	8:43320
31-83-Vol.2A-DD	NTIS MF A01; 2	DE83014825	MN -51	8:43322
31-83-Vol.2B-DA	NTIS MF A01; 2	DE83014847	MN -51	8:43324
31-83-Vol.2B-DB	NTIS, PC A11/MF A01; 1	DE83014848	MN -51	8:43316
31-83-Vol.2B-DC	NTIS, PC A08/MF A01; 1	DE83014849	MN -51	8:43318
31-83-Vol.2B-DD	NTIS MF A01; 2	DE83014850	MN -51	8:43315
31-83-Vol.2C-DA	NTIS MF A01; 2	DE83014826	MN -51	8:43317
31-83-Vol.2C-DB	NTIS MF A01; 2	DE83014851	MN -51	8:43321

Report No.	Availability	Order No.	Distribution Category	Abstract No.
GJO-				
100(83)	NTIS, PC A05/MF A01; 1	DE83014846	MN -51	8:43310
GKSS-				
82/ E/ 43	NTIS (US Sales Only), PC A02/MF A01	DE83750919	MN -25	8:44138
82/ E/ 44	NTIS (US Sales Only), PC A03/MF A01	DE83750921	MN -25	8:44442
GRI-				
81-0183	*See* SAND-83-0964	DE83015724	MN -91	8:43296
GSF-BPT-				
1/ 82	NTIS (US Sales Only), PC A09/MF A01	DE83750918	MN -48	8:44790
GSF-P-				
207	NTIS (US Sales Only), PC A05/MF A01	DE83750202	MN -34C	8:45040
GSI-				
82-8	NTIS (US Sales Only), PC A99/MF A01	DE83750205	MN -28	8:44468
GTFR-				
37	NTIS, PC A03/MF A01	DE83009532	MN -20b	8:45218
40	NTIS, PC A02/MF A01; 1	DE83009549	MN -20	8:45219
HB-				
17/ 82	*See* OEFZS-4179	DE83701837	MN -2	8:45322
HEDL-TME-				
83-17	NTIS, PC A04/MF A01	DE83015306	STD -20c	8:44139
HMI-B-				
383	NTIS (US Sales Only), PC A05/MF A01	DE83750916	MN -80	8:43887
IA-				
1374	NTIS (US Sales Only), PC A03/MF A01	DE83902608	MN -20	8:45220
IAE-				
3371/ 10	NTIS (US Sales Only), PC A02/MF A01	DE83702094	MN -38	8:44377
3404/ 5	NTIS (US Sales Only), PC A03/MF A01	DE83702136	MN -80	8:43841
3439/ 8	NTIS (US Sales Only), PC A04/MF A01	DE83702860	MN -20	8:45105
3447/ 4	NTIS (US Sales Only), PC A02/MF A01	DE83702210	MN -32	8:43790
3477/ 7	NTIS (US Sales Only), PC A04/MF A01	DE83702861	MN -20	8:45106
3498/ 14	NTIS (US Sales Only), PC A02/MF A01	DE83702862	MN -20	8:45221
3500/ 14	NTIS (US Sales Only), PC A02/MF A01	DE83702863	MN -20	8:45222
3513/ 7	NTIS (US Sales Only), PC A03/MF A01	DE83702864	MN -20	8:45223
3515/ 7	NTIS (US Sales Only), PC A02/MF A01	DE83702865	MN -20	8:45224
IAEA-R-				
1882-F	NTIS (US Sales Only), PC A02/MF A01	DE83702866	MN -20	8:45225
1896-F	NTIS (US Sales Only), PC A03/MF A01	DE83702069	MN -48	8:44791
2547-F	NTIS (US Sales Only), PC A03/MF A01	DE83701809	MN -80	8:43794
2581-F	NTIS (US Sales Only), PC A03/MF A01	DE83702087	MN -23	8:44360
2618-F	NTIS (US Sales Only), PC A02/MF A01	DE83702070	MN -23	8:44792
IAEA-RL-				
92(Rev.82)	NTIS (US Sales Only), PC A02/MF A01	DE83702085	MN -48	8:44768
IC-				
82/ 72	NTIS (US Sales Only), PC A02/MF A01	DE83703395	MN -20	8:45107
82/ 152	NTIS (US Sales Only), PC A02/MF A01	DE83703393	MN -20	8:45108
82/ 166	NTIS (US Sales Only), PC A02/MF A01	DE83703394	MN -20	8:45109
IDO-				
10057(82)	NTIS MF A01; 2	DE83015647	MN -69	8:44707
10086(82)	NTIS, PC A10/MF A01; 1	DE83015666	MN -70	8:43355
IFE/KR/E-				
6	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750787	MN -38	8:43290
9	NTIS (US Sales Only), PC A04/MF A01	DE83750790	MN -92	8:43274
10	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750788	MN -92	8:43275
16	NTIS (US Sales Only), PC A02/MF A01	DE83750789	MN -38	8:44444
82/ 004	NTIS (US Sales Only), PC A02/MF A01	DE83750786	MN -38	8:44445
IFP-				
30-368	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750925	MN -92b	8:43284
IFVE-OEA-OEIPK-				
82-15	NTIS (US Sales Only), PC A02/MF A01	DE83702189	MN -37	8:44570
IFVE-OEF-				
82-6	NTIS (US Sales Only), PC A02/MF A01	DE83702197	MN -37	8:44625
82-115	NTIS (US Sales Only), PC A02/MF A01	DE83702162	MN -37	8:44571
IFVE-OEIPK-				
82-122	NTIS (US Sales Only), PC A02/MF A01	DE83702163	MN -37	8:44572
IFVE-OI-				
82-10	NTIS (US Sales Only), PC A02/MF A01	DE83702190	MN -37	8:45291
IFVE-OMVT-				
82-9	NTIS (US Sales Only), PC A02/MF A01	DE83702213	MN -32	8:45292
82-71	NTIS (US Sales Only), PC A03/MF A01	DE83702211	MN -32	8:45293
82-84	NTIS (US Sales Only), PC A03/MF A01	DE83702212	MN -32	8:45294
IFVE-ONF-				
82-85	NTIS (US Sales Only), PC A02/MF A01	DE83702191	MN -37	8:44632
IFVE-ORI-				
82-46	NTIS (US Sales Only), PC A02/MF A01	DE83702164	MN -37	8:44573
IFVE-OUNK-				
82-27	NTIS (US Sales Only), PC A02/MF A01	DE83702100	MN -28	8:44534
82-109	NTIS (US Sales Only), PC A02/MF A01	DE83702099	MN -28	8:44493
IKE-				
2-59	NTIS (US Sales Only), PC A07/MF A01	DE83750922	MN -78	8:43911
ILE-				
8120P	NTIS (US Sales Only), PC A02/MF A01	DE83702867	MN -20	8:45110
8123P	NTIS (US Sales Only), PC A02/MF A01	DE83702868	MN -20	8:45226
8125P	NTIS (US Sales Only), PC A02/MF A01	DE83702869	MN -20	8:45227
8126P	NTIS (US Sales Only), PC A02/MF A01	DE83702870	MN -20	8:45228
8132P	NTIS (US Sales Only), PC A02/MF A01	DE83702871	MN -20	8:45111

Report No.	Availability	Order No.	Distribution Category	Abstract No.
IM-				
1636	See SVF-126	DE83750773	MN -25	8:44198
INDC(NDS)-				
136/ GA	NTIS (US Sales Only), PC A06/MF A01	DE83702872	MN -20	8:45112
INDC(YUG)-				
7	NTIS (US Sales Only), PC A03/MF A01	DE83702137	MN -80	8:43842
INIS-mf-				
7359	NTIS (US Sales Only), PC A02/MF A01	DE83780888	MN -2	8:44020
7592	NTIS (US Sales Only), PC A02/MF A01	DE83780935	MN -2	8:44021
7594	NTIS (US Sales Only), PC A03/MF A01	DE83780936	MN -2	8:44022
7607	NTIS (US Sales Only), PC A02/MF A01	DE83780934	MN -2	8:44023
7608	NTIS (US Sales Only), PC A02/MF A01	DE83780937	MN -2	8:44024
7614	NTIS (US Sales Only), PC A02/MF A01	DE83780920	MN -78	8:43769
7625	NTIS (US Sales Only), PC A02/MF A01	DE83780929	MN -78	8:43770
7627	NTIS (US Sales Only), PC A02/MF A01	DE83780918	MN -25	8:44140
7628	NTIS (US Sales Only), PC A02/MF A01	DE83780894	MN -38	8:44410
7629	NTIS (US Sales Only), PC A02/MF A01	DE83780895	MN -38	8:44411
7630	NTIS (US Sales Only), PC A02/MF A01	DE83780896	MN -38	8:44412
7631	NTIS (US Sales Only), PC A02/MF A01	DE83780897	MN -38	8:45080
7632	NTIS (US Sales Only), PC A02/MF A01	DE83780898	MN -38	8:44413
7633	NTIS (US Sales Only), PC A02/MF A01	DE83780899	MN -38	8:44414
7634	NTIS (US Sales Only), PC A02/MF A01	DE83780900	MN -38	8:44415
7635	NTIS (US Sales Only), PC A02/MF A01	DE83780930	MN -78	8:43771
7636	NTIS (US Sales Only), PC A02/MF A01	DE83780938	MN -38	8:44378
7637	NTIS (US Sales Only), PC A02/MF A01	DE83780931	MN -78	8:43772
7638	NTIS (US Sales Only), PC A02/MF A01	DE83780901	MN -38	8:44905
7639	NTIS (US Sales Only), PC A02/MF A01	DE83780902	MN -38	8:44416
7640	NTIS (US Sales Only), PC A02/MF A01	DE83780903	MN -38	8:44417
7641	NTIS (US Sales Only), PC A02/MF A01	DE83780904	MN -38	8:44418
7642	NTIS (US Sales Only), PC A02/MF A01	DE83780889	MN -80	8:43855
7643	NTIS (US Sales Only), PC A02/MF A01	DE83780921	MN -80	8:44379
7644	NTIS (US Sales Only), PC A02/MF A01	DE83780905	MN -38	8:44419
7645	NTIS (US Sales Only), PC A02/MF A01	DE83780906	MN -38	8:44420
7646	NTIS (US Sales Only), PC A02/MF A01	DE83780932	MN -78	8:43773
7647	NTIS (US Sales Only), PC A02/MF A01	DE83780907	MN -38	8:44421
7648	NTIS (US Sales Only), PC A02/MF A01	DE83780908	MN -38	8:44906
7649	NTIS (US Sales Only), PC A02/MF A01	DE83780919	MN -25	8:44141
7650	NTIS (US Sales Only), PC A02/MF A01	DE83780909	MN -38	8:44422
7651	NTIS (US Sales Only), PC A02/MF A01	DE83780922	MN -80	8:44380
7652	NTIS (US Sales Only), PC A02/MF A01	DE83780910	MN -38	8:44381
7653	NTIS (US Sales Only), PC A02/MF A01	DE83780911	MN -38	8:44423
7654	NTIS (US Sales Only), PC A02/MF A01	DE83780933	MN -78	8:43774
7655	NTIS (US Sales Only), PC A02/MF A01	DE83780912	MN -38	8:44382
7656	NTIS (US Sales Only), PC A02/MF A01	DE83780923	MN -80	8:44383
7657	NTIS (US Sales Only), PC A02/MF A01	DE83780924	MN -80	8:43856
7658	NTIS (US Sales Only), PC A02/MF A01	DE83780926	MN -80	8:43864
7659	NTIS (US Sales Only), PC A02/MF A01	DE83780913	MN -38	8:44424
7660	NTIS (US Sales Only), PC A02/MF A01	DE83780914	MN -38	8:44425
7662	NTIS (US Sales Only), PC A02/MF A01	DE83780915	MN -38	8:44426
7663	NTIS (US Sales Only), PC A02/MF A01	DE83780916	MN -38	8:44427
7664	NTIS (US Sales Only), PC A02/MF A01	DE83780925	MN -80	8:44384
7665	NTIS (US Sales Only), PC A02/MF A01	DE83780917	MN -38	8:44907
7666	NTIS (US Sales Only), PC A16/MF A01	DE83780890	MN -80	8:43843
7667	NTIS (US Sales Only), PC A18/MF A01	DE83780927	MN -80	8:44633
7670	NTIS (US Sales Only), PC A05/MF A01	DE83780939	MN -2	8:44012
7672	NTIS (US Sales Only), PC A06/MF A01	DE83780892	MN -48	8:44769
7673	NTIS (US Sales Only), PC A08/MF A01	DE83780887	MN -48	8:44793
7674	NTIS (US Sales Only), PC A06/MF A01	DE83780893	MN -48	8:44770
7680	NTIS (US Sales Only), PC A08/MF A01	DE83780886	MN -48	8:44747
7681	NTIS (US Sales Only), PC A07/MF A01	DE83780882	MN -48	8:44794
7682	NTIS (US Sales Only), PC A07/MF A01	DE83780884	MN -48	8:44795
7683	NTIS (US Sales Only), PC A03/MF A01	DE83780885	MN -48	8:44796
7687	NTIS (US Sales Only), PC A06/MF A01	DE83780883	MN -48	8:44797
7742	NTIS (US Sales Only), PC A17/MF A01	DE83780878	MN -34C	8:45029
7919	NTIS (US Sales Only), PC A10/MF A01	DE83780879	MN -4	8:44325
7961	NTIS (US Sales Only), PC A03/MF A01	DE83780881	MN -48	8:44363
7983	NTIS (US Sales Only), PC A06/MF A01	DE83780880	MN -48	8:44772
8024	NTIS (US Sales Only), PC A05/MF A01	DE83780877	MN -34D	8:44929
INIS-SU-				
136	NTIS (US Sales Only), PC A06/MF A01	DE83780875	MN -94	8:45233
137	NTIS (US Sales Only), PC A04/MF A01	DE83780876	MN -20	8:45236
147	NTIS (US Sales Only), PC A06/MF A01	DE83780874	MN -25	8:44280
INP-				
1089/ B	NTIS (US Sales Only), PC A04/MF A01	DE83702082	MN -48	8:44773
1090/ B	NTIS (US Sales Only), PC A03/MF A01	DE83702083	MN -48	8:44774
1091/ B	NTIS (US Sales Only), PC A02/MF A01	DE83702084	MN -48	8:44775
INS-NUMA-				
28	NTIS (US Sales Only), PC A07/MF A01	DE83780993	MN -34	8:44878
INT-				
156/ J	NTIS (US Sales Only), PC A02/MF A01	DE83702873	MN -20	8:45240
IPEN-Pub-				
41	NTIS (US Sales Only), PC A02/MF A01	DE83702144	MN -80	8:43749
43	NTIS (US Sales Only), PC A02/MF A01	DE83702159	MN -80	8:43890
IPPCZ-				
242	NTIS (US Sales Only), PC A02/MF A01	DE83702874	MN -20	8:45113

Report No.	Availability	Order No.	Distribution Category	Abstract No.
244	NTIS (US Sales Only), PC A21/MF A01	DE83780863	MN -20	8:45249
IPPJ-				
550	NTIS (US Sales Only), PC A02/MF A01	DE83702875	MN -20	8:45138
IPPJ-REV-				
1	NTIS (US Sales Only), PC A07/MF A01	DE83780864	MN -20	8:45143
IPSN-RA-				
1981	NTIS (US Sales Only), PC A07/MF A01	DE83702227	MN -2	8:43404
ISI-				
101907	NTIS (US Sales Only), PC A05/MF A01; 1	DE83751041	MN -95f	8:44025
ITEF-				
16(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83702166	MN -37	8:44576
28(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83702167	MN -37	8:44577
33(1982)	NTIS (US Sales Only), PC A02/MF A01	DE83702168	MN -37	8:44578
JEN-				
518	NTIS (US Sales Only), PC A04/MF A01	DE83701815	MN -37	8:44579
521	NTIS (US Sales Only), PC A03/MF A01	DE83701816	MN -37	8:44580
JINR-				
8-82-169	NTIS (US Sales Only), PC A02/MF A01	DE83702105	MN -28	8:44536
8-82-250	NTIS (US Sales Only), PC A02/MF A01	DE83702096	MN -38	8:44387
9-82-13	NTIS (US Sales Only), PC A02/MF A01	DE83702106	MN -28	8:45144
9-82-177	NTIS (US Sales Only), PC A02/MF A01	DE83702107	MN -28	8:44537
9-82-188	NTIS (US Sales Only), PC A02/MF A01	DE83702108	MN -28	8:44494
9-82-214	NTIS (US Sales Only), PC A02/MF A01	DE83702109	MN -28	8:44495
9-82-283	NTIS (US Sales Only), PC A02/MF A01	DE83702110	MN -28	8:44496
9-82-284	NTIS (US Sales Only), PC A02/MF A01	DE83702111	MN -28	8:44497
9-82-339	NTIS (US Sales Only), PC A02/MF A01	DE83702112	MN -28	8:44476
9-82-406	NTIS (US Sales Only), PC A02/MF A01	DE83702113	MN -28	8:44538
9-82-416	NTIS (US Sales Only), PC A02/MF A01	DE83702114	MN -28	8:44477
9-82-423	NTIS (US Sales Only), PC A02/MF A01	DE83702115	MN -28	8:44539
9-82-424	NTIS (US Sales Only), PC A02/MF A01	DE83702116	MN -28	8:44540
10-82-140	NTIS (US Sales Only), PC A02/MF A01	DE83702205	MN -32	8:44637
10-82-143	NTIS (US Sales Only), PC A02/MF A01	DE83702214	MN -32	8:45295
10-82-144	NTIS (US Sales Only), PC A02/MF A01	DE83702206	MN -32	8:44638
10-82-158	NTIS (US Sales Only), PC A02/MF A01	DE83702215	MN -32	8:44364
10-82-227	NTIS (US Sales Only), PC A02/MF A01	DE83702169	MN -37	8:44581
10-82-232	NTIS (US Sales Only), PC A02/MF A01	DE83702170	MN -37	8:44582
10-82-292	NTIS (US Sales Only), PC A02/MF A01	DE83702207	MN -32	8:45296
10-82-295	NTIS (US Sales Only), PC A02/MF A01	DE83702171	MN -37	8:44583
10-82-391	NTIS (US Sales Only), PC A02/MF A01	DE83702172	MN -37	8:44584
10-82-392	NTIS (US Sales Only), PC A02/MF A01	DE83702192	MN -37	8:44585
10-82-407	NTIS (US Sales Only), PC A02/MF A01	DE83702216	MN -32	8:43891
10-82-482	NTIS (US Sales Only), PC A02/MF A01	DE83702217	MN -32	8:45297
13-81-722	NTIS (US Sales Only), PC A02/MF A01	DE83702173	MN -37	8:44586
13-82-160	NTIS (US Sales Only), PC A02/MF A01	DE83702174	MN -37	8:44587
13-82-178	NTIS (US Sales Only), PC A02/MF A01	DE83702193	MN -37	8:44588
13-82-180	NTIS (US Sales Only), PC A02/MF A01	DE83702175	MN -37	8:44589
13-82-199	NTIS (US Sales Only), PC A02/MF A01	DE83702176	MN -37	8:44590
13-82-216	NTIS (US Sales Only), PC A02/MF A01	DE83702177	MN -37	8:44591
13-82-221	NTIS (US Sales Only), PC A02/MF A01	DE83702101	MN -28	8:44541
13-82-243	NTIS (US Sales Only), PC A02/MF A01	DE83702178	MN -37	8:44592
13-82-254	NTIS (US Sales Only), PC A02/MF A01	DE83702102	MN -28	8:44542
13-82-264	NTIS (US Sales Only), PC A02/MF A01	DE83702194	MN -37	8:44593
13-82-279	NTIS (US Sales Only), PC A02/MF A01	DE83702103	MN -28	8:44543
13-82-350	NTIS (US Sales Only), PC A02/MF A01	DE83702179	MN -37	8:44594
13-82-367	NTIS (US Sales Only), PC A02/MF A01	DE83702180	MN -37	8:44595
13-82-378	NTIS (US Sales Only), PC A04/MF A01	DE83702095	MN -38	8:44544
13-82-397	NTIS (US Sales Only), PC A02/MF A01	DE83702181	MN -37	8:44596
16-82-170	NTIS (US Sales Only), PC A02/MF A01	DE83702104	MN -28	8:44545
16-82-419	NTIS (US Sales Only), PC A02/MF A01	DE83702182	MN -37	8:44597
19-82-380	NTIS (US Sales Only), PC A02/MF A01	DE83702183	MN -37	8:44598
E-4-81-778	NTIS (US Sales Only), PC A02/MF A01	DE83701054	MN -34D	8:45081
R-10-82-369	NTIS (US Sales Only), PC A02/MF A01	DE83702220	MN -32	8:44599
R-10-82-460	NTIS (US Sales Only), PC A02/MF A01	DE83702221	MN -32	8:44600
JINR-D-				
13-82-417	NTIS (US Sales Only), PC A02/MF A01	DE83702184	MN -37	8:44601
JINR-R-				
7-81-744	NTIS (US Sales Only), PC A02/MF A01	DE83702196	MN -37	8:44602
8-81-770	NTIS (US Sales Only), PC A02/MF A01	DE83702093	MN -38	8:44428
9-82-124	NTIS (US Sales Only), PC A02/MF A01	DE83702119	MN -28	8:44546
9-82-168	NTIS (US Sales Only), PC A02/MF A01	DE83702120	MN -28	8:44498
9-82-175	NTIS (US Sales Only), PC A02/MF A01	DE83702121	MN -28	8:44499
9-82-301	NTIS (US Sales Only), PC A02/MF A01	DE83702122	MN -28	8:44547
9-82-317	NTIS (US Sales Only), PC A02/MF A01	DE83702123	MN -28	8:44548
10-82-105	NTIS (US Sales Only), PC A02/MF A01	DE83702218	MN -32	8:45298
10-82-211	NTIS (US Sales Only), PC A02/MF A01	DE83702199	MN -70	8:44603
10-82-217	NTIS (US Sales Only), PC A02/MF A01	DE83702208	MN -32	8:45299
10-82-237	NTIS (US Sales Only), PC A02/MF A01	DE83702219	MN -32	8:44604
10-82-238	NTIS (US Sales Only), PC A03/MF A01	DE83702185	MN -37	8:44605
10-82-368	NTIS (US Sales Only), PC A02/MF A01	DE83702097	MN -38	8:44388
11-81-784	NTIS (US Sales Only), PC A02/MF A01	DE83702195	MN -37	8:44606
11-82-230	NTIS (US Sales Only), PC A02/MF A01	DE83702117	MN -28	8:44549
11-82-233	NTIS (US Sales Only), PC A02/MF A01	DE83702118	MN -28	8:44500
13-82-374	NTIS (US Sales Only), PC A02/MF A01	DE83702186	MN -37	8:44607
14-82-203	NTIS (US Sales Only), PC A02/MF A01	DE83702209	MN -32	8:45300

Report No.	Availability	Order No.	Distribution Category	Abstract No.
Jael-				
1788	NTIS (US Sales Only), PC A06/MF A01	DE83750917	MN -77	8:43791
1808	NTIS (US Sales Only), PC A04/MF A01	DE83750914	MN -77	8:43848
1815	NTIS (US Sales Only), PC A10/MF A01; 1	DE83751078	MN -90i	8:43239
Jael-Spec-				
157	*See* KFK-3382	DE83750203	MN -77	8:43927
183	NTIS (US Sales Only), PC A04/MF A01	DE83750906	MN -77	8:43922
K-Trans-				
187	NTIS, PC A02/MF A01; 1	DE83014109	MN -4	8:44333
197	NTIS MF A01; 2	DE83013809	MN -4	8:44237
209	NTIS, PC A02/MF A01; 1	DE83014106	MN -25	8:44236
211	NTIS, PC A02/MF A01	DE83014128	MN -25	8:44238
214	NTIS MF A01; 2	DE83014116	MN -25	8:44240
KEK-				
81-2	NTIS (US Sales Only), PC A07/MF A01	DE83780994	MN -28	8:44448
KFK-				
3253	NTIS (US Sales Only), PC A03/MF A01	DE83750206	MN -79	8:43808
3256	NTIS (US Sales Only), PC A08/MF A01	DE83750209	MN -79	8:43809
3268	NTIS (US Sales Only), PC A04/MF A01	DE83751080	MN -38	8:44389
3283	NTIS (US Sales Only), PC A08/MF A01	DE83750208	MN -25	8:43810
3325	NTIS (US Sales Only), PC A06/MF A01	DE83750900	MN -79g	8:43923
3344	NTIS (US Sales Only), PC A03/MF A01	DE83750201	MN -34A	8:44879
3382	NTIS (US Sales Only), PC A05/MF A01	DE83750203	MN -77	8:43927
3386-B	NTIS (US Sales Only), PC A02/MF A01	DE83750196	MN -34C	8:45048
3391	NTIS (US Sales Only), PC A07/MF A01	DE83750204	MN -23	8:44608
3426	NTIS (US Sales Only), PC A08/MF A01	DE83750915	MN -79	8:43928
3432	NTIS (US Sales Only), PC A05/MF A01	DE83750908	MN -48	8:44798
3449	NTIS (US Sales Only), PC A02/MF A01	DE83750924	MN -80	8:43849
3462	NTIS (US Sales Only), PC A10/MF A01	DE83750920	MN -48	8:44799
3523	NTIS (US Sales Only), PC A07/MF A01; 1	DE83751079	MN -90i	8:43240
KFK-PDV-				
215	NTIS (US Sales Only), PC A03/MF A01	DE83750197	MN -32	8:43299
225	NTIS (US Sales Only), PC A03/MF A01	DE83751077	MN -92	8:43300
KFK-PFT-				
50	NTIS (US Sales Only), PC A06/MF A01; 1	DE83751046	MN -88	8:44390
KFK-tr-				
682	NTIS (US Sales Only), PC A02/MF A01	DE83780992	MN -20	8:45056
KFKI-				
1982-41	NTIS (US Sales Only), PC A03/MF A01	DE83701817	MN -37	8:44609
1982-45	NTIS (US Sales Only), PC A02/MF A01	DE83701818	MN -37	8:44610
KFTI-				
82-1	NTIS (US Sales Only), PC A03/MF A01	DE83702876	MN -20	8:45145
82-12	NTIS (US Sales Only), PC A02/MF A01	DE83702877	MN -20	8:45252
82-14	NTIS (US Sales Only), PC A02/MF A01	DE83702187	MN -37	8:44326
82-17	NTIS (US Sales Only), PC A02/MF A01	DE83702188	MN -37	8:44611
KHM-TR-				
35	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750769	MN -11	8:44743
39	*See* SVF-129	DE83750774	MN -90n	8:43264
KIYI-				
81-18	NTIS (US Sales Only), PC A02/MF A01	DE83702124	MN -28	8:44550
81-21	NTIS (US Sales Only), PC A02/MF A01	DE83702125	MN -28	8:44551
81-25	NTIS (US Sales Only), PC A02/MF A01	DE83702222	MN -32	8:45301
81-26	NTIS (US Sales Only), PC A03/MF A01	DE83702223	MN -32	8:45302
LA-				
4037-SOP-Rev.2-Suppl.1	NTIS, PC A02/MF A01	DE83014774	STD -46	8:43894
9325-MS	NTIS, PC A04/MF A01; 1	DE83015596	STD -70	8:43356
9350-M	NTIS, PC A03/MF A01	DE83014806	STD -32	8:44618
9510-MS	NTIS, PC A03/MF A01	DE83014800	STD -70	8:43357
9655-MS	NTIS, PC A02/MF A01	DE83014802	STD -10	8:43358
9660-UMT-Vol.1	*See* DOE/UMT-0263	DE83015420	MN -70A	8:43347
9660-UMT-Vol.3	*See* DOE/UMT-0265	DE83014810	STD -70A	8:43348
9666-PR	NTIS, PC A04/MF A01	DE83014805	STD -70	8:43359
9687-MS	NTIS, PC A03/MF A01	DE83014803	STD -20b	8:45253
9698-MS	NTIS, PC A03/MF A01	DE83014776	STD -32	8:45303
9708-MS	*See* NUREG/CR-3221	DE83015195	MN -15	8:43410
9749-MS	*See* NUREG/CR-3278	DE83015661	MN -78	8:43942
9752-MS	NTIS, PC A02/MF A01; 1	DE83014807	STD -32	8:45049
9755-PR	NTIS, PC A03/MF A01; 1	DE83014801	STD -20f	8:45254
9761-MS	NTIS, PC A02/MF A01	DE83015178	STD -20d	8:45255
9777-MS	NTIS, PC A02/MF A01	DE83014804	STD -91	8:43306
9781-M	NTIS, PC A03/MF A01; 1	DE83014798	MN -15	8:43405
9796-MS	NTIS, PC A03/MF A01	DE83015177	STD -13	8:43981
9804-MS	NTIS, PC A02/MF A01	DE83014822	STD -41	8:44800
9813-PR	NTIS, PC A02/MF A01	DE83014775	STD -33A	8:43417
9815-C	NTIS, PC A04/MF A01	DE83014773	STD -98F	8:44044
9824-MS	NTIS, PC A02/MF A01	DE83015595	STD -16	8:43406
LA-UR-				
83-399	NTIS, PC A02/MF A01	DE83007555	MN -11	8:43302
83-1699	NTIS, PC A03/MF A01; 1	DE83014195	MN -34	8:44639
83-1724	NTIS, PC A02/MF A01	DE83014118	MN -25	8:44172
83-1746	NTIS, PC A02/MF A01	DE83014121	MN -46	8:44975
83-1808	NTIS, PC A02/MF A01	DE83014151	MN -32	8:44552
83-1839	NTIS, PC A03/MF A01	DE83013865	MN -34C	8:44930
83-1851	NTIS, PC A02/MF A01	DE83014139	MN -4	8:44399

Report No.	Availability	Order No.	Distribution Category	Abstract No.
83-1854	NTIS, PC A02/MF A01; 1	DE83014140	MN -34	8:44327
LBL-				
3220-Vol.1	NTIS, PC A19/MF A01; 1	DE83014991	MN -66	8:43652
11654	NTIS, PC A06/MF A01; 1	DE83015417	MN -70	8:44817
11829	NTIS, PC A07/MF A01; 1	DE83015725	MN -70	8:43360
12469	NTIS, PC A04/MF A01; 1	DE83014919	MN -70	8:43361
12520	NTIS, PC A09/MF A01; 1	DE83015416	MN -70	8:44818
12574	NTIS, PC A06/MF A01	DE83015722	MN -70	8:43362
14202	NTIS, PC A02/MF A01; 1	DE83014864	MN -11	8:43363
14914-Rev.	NTIS, PC A02/MF A01; 1	DE83014856	MN -95d	8:44081
14938	NTIS, PC A02/MF A01	DE83015283	MN -25	8:44281
15227	NTIS, PC A04/MF A01; 1	DE83014911	MN -11	8:43269
15305	NTIS, PC A03/MF A01	DE83014797	STD -95d	8:44082
15381	NTIS, PC A02/MF A01	DE83014862	MN -37	8:44619
15526	NTIS, PC A04/MF A01; 1	DE83015355	STD -66b	8:43656
15676	NTIS, PC A02/MF A01; 1	DE83014861	MN -32	8:44620
16042	NTIS, PC A02/MF A01	DE83014900	MN -32	8:45304
16131	NTIS, PC A13/MF A01; 1	DE83014966	MN -63	8:43501
16135	NTIS, PC A02/MF A01; 1	DE83014902	MN -34D	8:44931
16152	NTIS, PC A08/MF A01; 1	DE83015356	MN -11	8:44744
16171	NTIS, PC A02/MF A01; 1	DE83014904	MN -32	8:44553
16190	NTIS, PC A04/MF A01	DE83014901	MN -25	8:44282
16197	NTIS, PC A02/MF A01; 1	DE83014903	MN -34D	8:44932
16241	NTIS, PC A02/MF A01	DE83014865	MN -34A	8:44880
16272	NTIS, PC A02/MF A01	DE83014794	STD -25	8:44283
LCC-				
014/ 82	NTIS (US Sales Only), PC A02/MF A01	DE83702141	MN -80	8:43857
LF-tr-				
127	NTIS, PC A03/MF A01; 1	DE83013964	MN -41	8:44695
LMSC-D-				
630248(Vol.2)	*See* SAN-1568-78/4(Vol.2)	DE83013287	STD -64	8:43543
LUIP-				
8206	NTIS (US Sales Only), PC A02/MF A01	DE83701059	MN -34A	8:44976
8207	NTIS (US Sales Only), PC A04/MF A01	DE83701058	MN -34A	8:45000
LUNFD6/NFFK-				
7019/ 1-21(1982)	*See* LUIP-8206	DE83701059	MN -34A	8:44976
7020/ 1-3(1982)	*See* LUIP-8207	DE83701058	MN -34A	8:45000
LUTVDG/(TVGL-				
3012) / 1-31/ 1981	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750853	MN -66b	8:43657
MA-				
51/ 82	*See* OEFZS-4179	DE83701837	MN -2	8:45321
MEA-				
2014	*See* NUREG/CP-0044-Vol.1	DE83902448	MN -80	8:43751
Memorandum-M-				
422	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770216	MN -60	8:43714
427	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770215	MN -60	8:43715
MPE-				
177	NTIS (US Sales Only), PC A16/MF A01	DE83780866	MN -34B	8:44825
MPI-PAE/EXTRATERR-				
169	NTIS (US Sales Only), PC A10/MF A01	DE83750901	MN -34B	8:44826
MST-LUFT-A-				
55	NTIS (US Sales Only), PC A04/MF A01	DE83750845	MN -11	8:44679
62	NTIS (US Sales Only), PC A03/MF A01	DE83750762	MN -11	8:44680
MTR-				
82W73	NTIS, PC A03/MF A01	DE83015122	MN -66j	8:43659
82W79	NTIS, PC A03/MF A01	DE83015124	MN -66f	8:43653
82W159	NTIS, PC A05/MF A01; 1	DE83015123	MN -66f	8:43663
NASA-CR-				
134957	*See* DOE/NASA/9235-75/2	DE83014895	STD -60	8:43706
165326-Vol.1	*See* DOE/NASA/0175-1-Vol.1	DE83015272	STD -90d	8:43174
165326-Vol.2	*See* DOE/NASA/0175-1-Vol.2	DE83015273	STD -90d	8:43175
165326-Vol.3	*See* DOE/NASA/0175-1-Vol.3	DE83015274	MN -90d	8:43176
165326-Vol.4	*See* DOE/NASA/0175-1-Vol.4	DE83015275	STD -90d	8:43177
167950	*See* DOE/NASA/0210-1	DE83014588	STD -90	8:44056
168061	*See* DOE/NASA/0287-1	DE83015325	STD -96	8:44127
168088	*See* DOE/NASA/3194-1	DE83015181	STD -96	8:44123
NASA-TM-				
83363	*See* DOE/NASA/12726-20	DE83015307	STD -94cb	8:44057
83393	*See* DOE/NASA/51044-30	DE83015308	STD -96	8:44126
ND-R-				
610(s)	NTIS (US Sales Only), PC A24/MF A01	DE83701804	MN -78	8:43929
658(S)	NTIS (US Sales Only), PC A02/MF A01	DE83702200	MN -70	8:43364
NE/FBA-				
82-10	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750766	MN -13	8:43471
82-14	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750775	MN -11	8:43972
NE-SBT-				
81-31	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750771	MN -61a	8:43502
82-10	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750778	MN -88	8:43244
82-30	NTIS (US Sales Only), PC A06/MF A01; 1	DE83750765	MN -90c	8:43182
82-31	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750772	MN -61a	8:43503
NE-TFS-				
82-4	NTIS (US Sales Only), PC A07/MF A01; 1	DE83750783	MN -13	8:43266
NE-VIND-				
82-38	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750780	MN -60	8:43676
82-45	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750782	MN -60	8:43716

Report No.	Availability	Order No.	Distribution Category	Abstract No.
NFL-				
34	NTIS (US Sales Only), PC A04/MF A01	DE83701060	MN -34A	8:45015
NIIAR-				
3(518)	NTIS (US Sales Only), PC A02/MF A01	DE83702146	MN -78	8:43750
13(528)	NTIS (US Sales Only), PC A02/MF A01	DE83702138	MN -80	8:43850
53(506)	NTIS (US Sales Only), PC A02/MF A01	DE83702139	MN -80	8:43851
56(509)	NTIS (US Sales Only), PC A02/MF A01	DE83702130	MN -25	8:43792
58(511)	NTIS (US Sales Only), PC A02/MF A01	DE83702154	MN -79	8:43812
60(513)	NTIS (US Sales Only), PC A02/MF A01	DE83702160	MN -80	8:43892
NIIEFA-P-K-				
0564	NTIS (US Sales Only), PC A03/MF A01	DE83702126	MN -28	8:44478
NILU-OR-				
1/ 81	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750784	MN -11	8:43294
13/ 81	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750848	MN -11	8:44708
17/ 81-ES	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750792	MN -11	8:44173
19/ 81	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750849	MN -11	8:44681
26/ 81	NTIS (US Sales Only), PC A02/MF A01	DE83750850	MN -61a	8:43504
NILU-TR-				
5/ 82	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750851	MN -90i	8:44682
15/ 81	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750785	MN -90i	8:43241
NLCO-				
1192	NTIS, PC A02/MF A01; 1	DE83014879	MN -16	8:43407
NLCO-tr-				
16	NTIS, PC A03/MF A01; 1	DE83013079	MN -47	8:43328
17	NTIS, PC A02/MF A01	DE83013083	MN -47	8:43327
NMEI-				
61-26	NTIS, PC A08/MF A01	DE83015296	MN -66i	8:43661
NMERDI-				
2-70-3302	New Mexico Energy Research Development Inst., Information Center, Univ. of New Mexico, 117 Richmond Dr., N.E., Albuquerque, NM 87106		MN -92a	8:43276
NP-				
3750779	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750779	MN -60	8:43717
3750791	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750791	MN -92a	8:43287
3750846	NTIS (US Sales Only), PC A03/MF A01	DE83750846	MN -88	8:43245
3770002	NTIS (US Sales Only), PC A03/MF A01; 1	DE83770002	MN -97b	8:44111
3770003	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770003	MN -97b	8:44112
3770004	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770004	MN -95	8:44090
3770005	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770005	MN -88	8:44391
3770006	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770006	MN -88	8:43251
3770007	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770007	MN -25	8:44174
3770008	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770008	MN -11	8:44754
3770043	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770043	MN -90c	8:43183
3770044	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770044	MN -11	8:44683
3770045	NTIS (US Sales Only), PC A06/MF A01; 1	DE83770045	MN -13	8:44013
3770135	NTIS (US Sales Only), PC A06/MF A01	DE83770135	MN -97c	8:43731
3770137	NTIS (US Sales Only), PC A02/MF A01	DE83770137	MN -98F	8:43982
3770139	NTIS (US Sales Only), PC A02/MF A01	DE83770139	MN -96	8:44091
3770140	NTIS (US Sales Only), PC A07/MF A01	DE83770140	MN -11	8:44122
3770141	NTIS (US Sales Only), PC A11/MF A01; 1	DE83770141	MN -59	8:43642
3770142	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770142	MN -95e	8:44101
3770143	NTIS (US Sales Only), PC A04/MF A01	DE83770143	MN -88	8:43220
3770144	NTIS (US Sales Only), PC A11/MF A01; 1	DE83770144	MN -38	8:44392
3770150	NTIS (US Sales Only), PC A02/MF A01	DE83770150	MN -89	8:43184
3770180	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770180	MN -11	8:44685
3770181	NTIS (US Sales Only), PC A05/MF A01; 1	DE83770181	MN -11	8:44686
3770182	NTIS (US Sales Only), PC A09/MF A01; 1	DE83770182	MN -90a	8:43192
3770183	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770183	MN -59	8:43643
3770185	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770185	MN -35	8:44368
3770186	NTIS (US Sales Only), PC A04/MF A01	DE83770186	MN -48	8:44807
3770187	NTIS (US Sales Only), PC A07/MF A01; 1	DE83770187	MN -95f	8:44083
3770188	NTIS (US Sales Only), PC A02/MF A01; 1	DE83770188	MN -97a	8:43732
3770189	NTIS (US Sales Only), PC A08/MF A01; 1	DE83770189	MN -97a	8:43738
3770190	NTIS (US Sales Only), PC A07/MF A01	DE83770190	MN -97a	8:43739
3770191	NTIS (US Sales Only), PC A09/MF A01; 1	DE83770191	MN -97a	8:43740
3770192	NTIS (US Sales Only), PC A09/MF A01; 1	DE83770192	MN -97a	8:43741
3770193	NTIS (US Sales Only), PC A10/MF A01; 1	DE83770193	MN -97c	8:43733
3770194	NTIS (US Sales Only), PC A04/MF A01; 1	DE83770194	MN -98G	8:43983
3770195	NTIS (US Sales Only), PC A09/MF A01; 1	DE83770195	MN -38	8:44446
3902382	NTIS (US Sales Only), PC A05/MF A01; 1	DE83902382	MN -80	8:43834
3902383	Kernforschungsanlage Julich GmbH, Postfach 1913, 5170 Juelich, Germany		ND -13	8:43835
3902474	NTIS (US Sales Only), PC A02/MF A01	DE83902474	MN -13	8:44908
3902518	NTIS, PC A03/MF A01	DE83902518	MN -98	8:43644
3902520	The Geological Survey of Wyoming, Box 3008, University Station, Laramie, WY 82071		ND -66	8:43654
3902856	New Mexico Energy and Minerals Dept., P.O. Box 2770, Santa Fe, NM 87503		MN -95d	8:44084
3902881	Dept. of the Interior, Office of Offshore Information Services, Minerals Management Service, 12203 Sunrise Valley Dr., MS 640, Reston, VA 22091		MN -92	8:44040
3902919	College of Engineering and Applied Sciences, Arizona State Univ., Tempe, AZ 85287		MN -63c	8:43505
NP-tr-				
3901778	NTIS (US Sales Only), PC A02/MF A01; 1	DE83901778	MN -92	8:43301

Report No.	Availability	Order No.	Distribution Category	Abstract No.
NRCN-				
514	NTIS (US Sales Only), PC A06/MF A01	DE83701795	MN -80	8:43872
NRCN(TN)-				
044	NTIS (US Sales Only), PC A02/MF A01	DE83701819	MN -37	8:44621
NUCLEBRAS-CDTN-				
441/ 82	NTIS (US Sales Only), PC A02/MF A01	DE83702150	MN -78	8:43831
NUREG-				
0040-Vol.7-No.2	NTIS, PC A12/MF A01 - GPO	DE83902874	MN -2	8:43821
0485-Vol.5-No.6	NTIS, PC A04/MF A01; 1 - GPO	DE83902882	MN -80	8:43822
0580-Vol.12-No.6	NTIS, PC A04/MF A01 - GPO	DE83902870	MN -80	8:43823
0750-Vol.16-No.3	NTIS, PC A16/MF A01 - GPO	DE83902872	MN -80	8:43824
0824-Final	NTIS, PC A23/MF A01; 1 - GPO $12.00	DE83901892	MN -78	8:43930
0825-Final	NTIS, PC A25/MF A01; 1 - GPO $11.00	DE83902871	MN -78	8:43931
0826-Final	NTIS, PC A99/MF A01; 1 - GPO $11.00	DE83902890	MN -80	8:43932
0896-Suppl.2	NTIS, PC A02/MF A01 - GPO $3.25	DE83902853	MN -78	8:43933
0904-FINAL	NTIS, PC A22/MF A01; 1 - GPO $10.00	DE83902259	MN -11	8:44756
1011	NTIS, PC A03/MF A01; 1 - GPO	DE83902873	MN -78	8:43876
NUREG/BR-				
0025-Vol.9-No.5	NTIS, PC A02/MF A01 - GPO	DE83902262	MN -70A	8:43365
NUREG/CP-				
0044-Vol.1	NTIS, PC A14/MF A01; 1 - GPO $7.50	DE83902448	MN -80	8:43751
0044-Vol.2	NTIS, PC A19/MF A01; 1 - GPO $9.00	DE83902447	MN -78	8:44178
NUREG/CR-				
0200-Vol.1-R2	NTIS PC E08/MF A01; 1	DE83013778	MN -15	8:43408
0200-Vol.2-Rev.1	NTIS, PC A14/MF A01 - GPO	DE83013780	MN -15	8:43409
2000-Vol.2-No.6	NTIS, PC A05/MF A01 - GPO	DE83015183	MN -80	8:43934
2475	NTIS, PC A03/MF A01 - GPO $3.75	DE83014967	MN -78	8:43935
2595	NTIS, PC A07/MF A01 - GPO $5.00	DE83902531	MN -41	8:43936
2599	NTIS (US Sales Only), PC A03/MF A01 - GPO $3.75	DE83015435	MN -78	8:43937
2843/ 3	NTIS, PC A05/MF A01 - GPO; 1	DE83013694	MN -78	8:43938
2884	NTIS PC E04/MF A01 - GPO $6.00	DE83014580	MN -70A	8:43756
2915(83)	NTIS, PC A04/MF A01; - GPO $4.75	DE83009775	MN -78	8:43939
2938	NTIS, PC A05/MF A01 - GPO $4.50	DE83015038	MN -70A	8:43366
2957	NTIS, PC A02/MF A01 - GPO $3.25	DE83015437	MN -41	8:45059
3085-Vol.3	NTIS MF A01; 2 - GPO	DE83015411	MN -78	8:43757
3122	NTIS, PC A05/MF A01 - GPO	DE83015034	MN -38	8:44452
3132	NTIS, PC A03/MF A01 - GPO	DE83015453	MN -78	8:43877
3161	NTIS, PC A02/MF A01 - GPO	DE83015001	MN -78	8:43785
3175	NTIS, PC A04/MF A01 - GPO $4.50	DE83015663	MN -80	8:43940
3221	NTIS, PC A08/MF A01	DE83015195	MN -15	8:43410
3241	NTIS MF A01; 2 - GPO	DE83015644	MN -79p	8:43941
3278	NTIS, PC A06/MF A01; 1 - GPO $5.00	DE83015661	MN -78	8:43942
3283	NTIS, PC A04/MF A01 - GPO	DE83015643	MN -80	8:43943
3289	NTIS, PC A09/MF A01; 1 - GPO	DE83014939	MN -80	8:43873
3315	NTIS, PC A14/MF A01; 1 - GPO	DE83015645	MN -80	8:43944
3333	NTIS, PC A03/MF A01 - GPO	DE83015660	MN -25	8:43786
3359-Vol.1	NTIS, PC A03/MF A01; 1	DE83015044	MN -79p	8:43945
3363-Vol.1	NTIS, PC A09/MF A01 - GPO $6.00	DE83902887	MN -38	8:44429
3363-Vol.2	NTIS, PC A15/MF A01 - GPO $7.50	DE83902888	MN -38	8:44430
NYSERDA-				
82-25-Vol.2	NTIS, PC A18/MF A01	DE83014379	MN -90	8:43246
NZERDC-				
70-12-82	NTIS (US Sales Only), PC A04/MF A01	DE83901723	MN -98	8:44047
90	NTIS (US Sales Only), PC A03/MF A01	DE83902876	MN -61a	8:43452
NZERDC-P-				
67	NTIS (US Sales Only), PC A04/MF A01	DE83901725	MN -98	8:44048
OA-tr-				
1863	NTIS (US Sales Only), PC A02/MF A01	DE83001770	MN -95f	8:44106
OCS-				
73-Vol.1	Department of the Interior, Minerals Management Service, 1340 West Sixth Street, Los Angeles, CA 90017		MN -92a	8:43288
73-Vol.2	Department of the Interior, Minerals Management Service, 1340 West Sixth Street, Los Angeles, CA 90017		MN -92a	8:43289
OEFZS-				
4154	NTIS (US Sales Only), PC A02/MF A01	DE83702073	MN -41	8:43946
4179	NTIS (US Sales Only), PC A03/MF A01	DE83701837	MN -2	8:45322
ONWI-				
169	NTIS, PC A05/MF A01	DE83015324	MN -70	8:44008
242	NTIS, PC A11/MF A01; 1	DE83015314	MN -70	8:43367
390	NTIS, PC A05/MF A01; 1	DE83015359	MN -70	8:43368
391	NTIS, PC A06/MF A01; 1	DE83015917	MN -70	8:43369
392	NTIS, PC A05/MF A01; 1	DE83015918	MN -70	8:43370
467-Vol.1	NTIS, PC A09/MF A01; 1	DE83015362	MN -70	8:43371
467-Vol.2	NTIS, PC A12/MF A01; 1	DE83015361	MN -70	8:43372
480	NTIS PC E07/MF A01	DE83015419	MN -70	8:44813
481	NTIS, PC A04/MF A01	DE83015175	MN -70	8:43373
ORAU/IEA-				
83-5(M)	NTIS, PC A05/MF A01	DE83014932	MN -2	8:43825
83-7(M)	NTIS, PC A03/MF A01	DE83015638	MN -78	8:43947
ORNL/CSD-				
120	NTIS, PC A04/MF A01	DE83014889	STD -32	8:45305
ORNL/FEDC-				
83/ 1	NTIS, PC A20/MF A01	DE83015072	STD -20c	8:45256
ORNL/FMP-				
83/ 2	NTIS, PC A18/MF A01; 1	DE83014888	MN -90	8:43185

Report No.	Availability	Order No.	Distribution Category	Abstract No.
ORNL/NSIC-				
200-Vol.2.No.6	*See* NUREG/CR-2000-Vol.2-No.6	DE83015183	MN -80	8:43934
213	*See* NUREG/CR-3122	DE83015034	MN -38	8:44452
ORNL/NUREG/CSD-				
2/ Vol.1-R2	*See* NUREG/CR-0200-Vol.1-R2	DE83013778	MN -15	8:43408
2/ Vol.2/ Rev.1	*See* NUREG/CR-0200-Vol.2-Rev.1	DE83013780	MN -15	8:43409
ORNL/SUB-				
82/ 69604/ 1	NTIS, PC A06/MF A01	DE83015746	STD -60	8:43718
ORNL/TM-				
5286	NTIS, PC A03/MF A01	DE83015033	MN -41	8:44706
8234	NTIS, PC A03/MF A01	DE83014890	STD -20	8:45146
8601	NTIS, PC A03/MF A01	DE83014891	STD -20	8:45257
8699	NTIS, PC A03/MF A01	DE83014892	STD -20	8:45147
8741	*See* NUREG/CR-3161	DE83015001	MN -78	8:43785
8747	NTIS, PC A03/MF A01	DE83015073	MN -80	8:43893
8771	NTIS, PC A05/MF A01	DE83014887	MN -13	8:44026
8789	*See* NUREG/CR-3333	DE83015660	MN -25	8:43786
8798	NTIS, PC A02/MF A01	DE83015754	MN -70	8:43374
ORNL-tr-				
4875	NTIS, PC A03/MF A01; 1	DE82021362	MN -80	8:43861
4990	NTIS, PC A02/MF A01; 1	DE83013802	MN -38	8:44239
4994	NTIS, PC A03/MF A01	DE83015040	MN -70	8:43399
5033	NTIS, PC A02/MF A01; 1	DE83015041	MN -32	8:45057
ORO-				
4568-35	*See* DOE/EV/04568-35	DE83015031	MN -48	8:44788
OTA-CIT-				
187	GPO		ND -13	8:44119
PATENTS-US-	(US: Commissioner of Patents, Washington, D.C. 20231, USA, $1.00 per copy. Government Patent Applications available from NTIS)			
4,382,335				8:44651
4,383,009				8:44058
4,383,014				8:43980
4,383,855				8:44248
4,384,168				8:44396
4,385,519				8:43866
4,385,943				8:44209
4,386,019				8:43979
4,386,049				8:43954
4,389,571				8:44508
4,389,633				8:44649
4,389,670				8:44648
4,390,786				8:44624
A 6-412,417		DE83013154	MN -63	8:43512
PEP-NOTE-				
372	NTIS, PC A02/MF A01	DE83014829	MN -28	8:44560
373	NTIS, PC A02/MF A01; 1	DE83014830	MN -28	8:44501
374	NTIS, PC A02/MF A01	DE83014831	MN -28	8:44502
375	NTIS, PC A02/MF A01	DE83015085	MN -28	8:44503
377	NTIS, PC A02/MF A01	DE83015084	MN -28	8:44504
378	NTIS, PC A02/MF A01	DE83015083	MN -28	8:44505
PFC/RR-				
83-10	*See* DOE/ET/51013-80	DE83015424	MN -20f	8:45100
PNL-				
4190	*See* NUREG/CR-2599	DE83015435	MN -78	8:43937
4343	*See* NUREG/CR-2884	DE83014580	MN -70A	8:43756
4453	*See* NUREG/CR-2938	DE83015038	MN -70A	8:43366
4488	NTIS, PC A04/MF A01; 1	DE83014906	MN -70	8:43375
4590	*See* NUREG/CR-2957	DE83015437	MN -41	8:45059
4641	*See* NUREG/CR-3175	DE83015663	MN -80	8:43940
4659	NTIS, PC A05/MF A01; 1	DE83014885	MN -41	8:44748
4725	NTIS, PC A04/MF A01; 1	DE83015180	MN -95d	8:44085
4734	NTIS, PC A03/MF A01; 1	DE83015022	STD -95f	8:44102
4752	*See* DOE/UMT-0064	DE83015176	MN -70	8:43346
4764	NTIS, PC A06/MF A01; 1	DE83015358	MN -95d	8:44086
4770	NTIS, PC A05/MF A01	DE83015020	STD -95f	8:44103
PNL-SA-				
7279	NTIS, PC A02/MF A01; 1	DE83014874	MN -70	8:43376
9157	NTIS, PC A02/MF A01	DE83014645	MN -25	8:44194
9501	NTIS, PC A03/MF A01	DE83015299	MN -38	8:44431
9530	NTIS, PC A03/MF A01	DE83015431	MN -12	8:44432
9566	NTIS, PC A06/MF A01; 1	DE83014945	MN -60	8:43719
9575	NTIS, PC A02/MF A01; 1	DE83015097	MN -48	8:44687
9619	NTIS, PC A03/MF A01	DE83015095	MN -11	8:45306
9661	NTIS, PC A02/MF A01; 1	DE83013999	MN -88	8:43252
9668	NTIS, PC A02/MF A01	DE83015089	MN -48	8:44776
9709	NTIS, PC A02/MF A01; 1	DE83015076	MN -11	8:44717
9720	NTIS, PC A03/MF A01; 1	DE83015091	MN -90b	8:43254
9729	NTIS, PC A02/MF A01; 1	DE83015093	MN -80	8:43948
9839	NTIS, PC A03/MF A01	DE83015090	MN -48	8:44786
9872	NTIS, PC A02/MF A01	DE83014534	MN -70	8:43333
9916	NTIS, PC A02/MF A01	DE83014097	MN -48	8:44759
9928	NTIS, PC A02/MF A01	DE83014642	MN -80	8:43813
9981	NTIS, PC A03/MF A01	DE83014980	MN -88	8:43255
9992	NTIS, PC A02/MF A01	DE83015075	MN -2	8:43949

Report No.	Availability	Order No.	Distribution Category	Abstract No.
10092	NTIS, PC A02/MF A01	DE83014000	MN -11	8:45307
10433	NTIS, PC A03/MF A01; 1	DE83015096	MN -11	8:45308
10508	NTIS, PC A03/MF A01	DE83015078	MN -90i	8:43193
10738	NTIS, PC A02/MF A01	DE83014493	MN -94e	8:43973
10750	NTIS, PC A03/MF A01	DE83015436	MN -70	8:44819
10818	NTIS (US Sales Only), PC A02/MF A01	DE83015088	MN -78	8:43787
10893	NTIS, PC A02/MF A01	DE83014647	MN -13	8:43989
11145	NTIS, PC A02/MF A01	DE83013833	MN -94e	8:43974
11299	NTIS, PC A03/MF A01	DE83015094	MN -11	8:44718
11306	NTIS, PC A21/MF A01; 1	DE83013366	MN -61a	8:43425
PNL-TR-				
424	NTIS, PC A02/MF A01	DE83014783	MN -61	8:43528
PPPL-				
1939	NTIS, PC A03/MF A01	DE83014916	STD -20f	8:45148
2001	NTIS, PC A02/MF A01	DE83012428	STD -20g	8:45149
2003	NTIS, PC A03/MF A01	DE83014917	STD -20	8:44400
2009	NTIS, PC A02/MF A01	DE83014913	STD -20f	8:45150
2013	NTIS, PC A03/MF A01	DE83014915	STD -20f	8:45151
2018	NTIS, PC A02/MF A01	DE83014914	STD -20f	8:45152
R-				
81-955568-1	*See* DOE/MC/16221-T2	DE81028604	MN -90a	8:43191
RBS-				
3(rev.)	NTIS (US Sales Only), PC A02/MF A01	DE83702145	MN -80	8:43895
RFP-				
3357	NTIS, PC A08/MF A01; 1	DE83015674	MN -70	8:43377
RFP-ABST-				
09	NTIS, PC A02/MF A01; 1	DE83015028	MN -10	8:43326
RFP-Trans-				
406	NTIS, PC A02/MF A01; 1	DE83015032	MN -69	8:44746
RHO-BW-SA-				
271P	NTIS MF A01; 2	DE83015079	MN -70	8:43378
RHO-BWI-LD-				
29	NTIS MF A01; 2	DE83015563	MN -70	8:43379
Rijnhuizen-				
82-143	NTIS (US Sales Only), PC A02/MF A01	DE83703396	MN -20	8:45153
82-144	NTIS (US Sales Only), PC A03/MF A01	DE83703397	MN -20	8:45154
RISLEY-Trans-				
4334	NTIS (US Sales Only), PC A02/MF A01; 1	DE83902215	MN -60	8:43670
RISO-M-				
2344	NTIS (US Sales Only), PC A06/MF A01; Also available from Risoe Library, DK-4000 Roskilde, Denmark	DE83701061	MN -34A	8:44640
2364	NTIS (US Sales Only), PC A02/MF A01	DE83750761	MN -60	8:43720
RISO-R-				
463	NTIS (US Sales Only), PC A02/MF A01	DE83750844	MN -11	8:44688
RL-				
82-036	NTIS (US Sales Only), PC A03/MF A01	DE83702081	MN -48	8:44777
82-038	NTIS (US Sales Only), PC A02/MF A01	DE83701823	MN -37	8:44622
82-071	NTIS (US Sales Only), PC A03/MF A01	DE83702224	MN -2	8:44623
RS-				
199/ 82	*See* OEFZS-4154	DE83702073	MN -41	8:43946
RTI-				
2224/ 01-01F	*See* DOE/MC/16441-1423	DE83014550	STD -90i	8:43217
SAAS-				
293	NTIS (US Sales Only), PC A02/MF A01	DE83701820	MN -37	8:45309
295	NTIS (US Sales Only), PC A03/MF A01	DE83702203	MN -16	8:43411
296	NTIS (US Sales Only), PC A02/MF A01	DE83702204	MN -16	8:43412
SAC-				
33	*See* LBL-12469	DE83014919	MN -70	8:43361
34	*See* LBL-11829	DE83015725	MN -70	8:43360
35	*See* LBL-12574	DE83015722	MN -70	8:43362
36	*See* LBL-11654	DE83015417	MN -70	8:44817
37	*See* LBL-12520	DE83015416	MN -70	8:44818
SAN-				
1196-8	*See* DOE/ET/11304-T8	DE83014972	MN -93	8:44055
1568-78/ 4(Vol.2)	NTIS MF A01; 2	DE83013287	STD -64	8:43543
SAND-				
80-0202	NTIS, PC A03/MF A01; 1	DE83014466	STD -70	8:43380
81-1405C	NTIS, PC A02/MF A01	DE81030709	MN -4	8:43381
81-7206	NTIS, PC A07/MF A01; 1	DE83014855	MN -70	8:43382
82-0525	NTIS, PC A03/MF A01; 1	DE83014793	MN -70	8:43383
82-1730	NTIS, PC A02/MF A01	DE83015357	MN -37	8:44641
82-1788-Vol.3	*See* NUREG/CR-2843/3	DE83013694	MN -78	8:43938
82-1937C	NTIS, PC A02/MF A01; 1	DE83013991	MN -71	8:43334
82-1951C	NTIS, PC A02/MF A01	DE83015100	MN -71	8:43335
82-1952C	NTIS MF A01; 2	DE83015102	MN -71	8:43336
82-2115	NTIS, PC A02/MF A01	DE83015631	MN -32	8:43721
82-2280	NTIS, PC A02/MF A01	DE83015311	MN -25	8:44642
82-2980	NTIS, PC A05/MF A01; 1	DE83015637	MN -70	8:43384
82-7212-Vol.3	*See* NUREG/CR-3085-Vol.3	DE83015411	MN -78	8:43757
83-0166	NTIS, PC A04/MF A01	DE83014796	MN -70	8:43385
83-0278	NTIS, PC A05/MF A01; 1	DE83015634	MN -66	8:43665
83-0280	NTIS, PC A04/MF A01; 1	DE83015633	MN -70	8:43386
83-0414	NTIS, PC A03/MF A01	DE83015457	MN -13	8:44453
83-0443C	NTIS, PC A02/MF A01	DE83015208	MN -78	8:43950
83-0479C	NTIS, PC A02/MF A01; 1	DE83015103	MN -84	8:44626

Report No.	Availability	Order No.	Distribution Category	Abstract No.
83-0536C	NTIS, PC A02/MF A01; 1	DE83015207	MN -4	8:44351
83-0537C	NTIS, PC A02/MF A01; 1	DE83015189	MN -34A	8:45066
83-0653C	NTIS, PC A02/MF A01	DE83013993	MN -37	8:44627
83-0672C	NTIS, PC A03/MF A01; 1	DE83015107	MN -11	8:44814
83-0697C	NTIS, PC A02/MF A01	DE83014611	MN -25	8:44284
83-0772C	NTIS, PC A02/MF A01; 1	DE83015205	MN -25	8:44195
83-0794	NTIS, PC A04/MF A01; 1	DE83015588	MN -91	8:43305
83-0801C	NTIS, PC A02/MF A01	DE83015206	MN -38	8:44196
83-0964	NTIS, PC A06/MF A01; 1	DE83015724	MN -91	8:43296
83-1058	NTIS, PC A03/MF A01; 1	DE83015415	MN -13	8:44643
83-1110	NTIS, PC A05/MF A01	DE83015635	MN -32	8:45310
83-1119	NTIS, PC A03/MF A01; 1	DE83014792	MN -32	8:45311
83-1192	NTIS, PC A03/MF A01	DE83014791	STD -78	8:43951
83-1300C	NTIS, PC A02/MF A01	DE83015105	MN -25	8:44285
83-1433C	NTIS, PC A02/MF A01; 1	DE83013990	MN -37	8:44628
83-1601C	NTIS, PC A02/MF A01	DE83015112	MN -37	8:44393
83-1608C	NTIS, PC A02/MF A01	DE83014779	MN -25	8:44197
83-7100	NTIS, PC A03/MF A01	DE83015632	MN -92a	8:43277
83-8231	NTIS PC E02/MF A01; 1	DE83014935	MN -32	8:45312
SERI/SP-				
741-399	NTIS, PC A03/MF A01	DE83014245	MN -58	8:43481
SERI/STR-				
231-1745	NTIS, PC A07/MF A01; 1	DE83009108	STD -61a	8:43453
231-1860	NTIS, PC A05/MF A01	DE83011967	STD -62e	8:43651
231-1910	NTIS, PC A05/MF A01	DE83011969	STD -61a	8:43439
SERI/TP-				
211-1952	NTIS, PC A02/MF A01; 1	DE83011978	STD -63	8:43508
212-1970	NTIS, PC A02/MF A01; 1	DE83011977	STD -63	8:43509
214-1976	NTIS, PC A02/MF A01; 1	DE83011968	STD -60	8:43678
252-1922	NTIS MF A01; 2	DE83011966	STD -59a	8:43645
SERI/TR-				
231-1714	NTIS, PC A05/MF A01; 1	DE83009109	STD -61	8:43454
231-1926	NTIS, PC A03/MF A01; 1	DE83009394	STD -61a	8:44052
SFB-				
80/ E/ 200	NTIS (US Sales Only), PC A03/MF A01; 1	DE83751081	MN -12	8:44751
80/ TE/ 196	Available from Fachinformationszentrum Energie, Physik, Mathematik, Karlsruhe (Germany, F.R.)			8:44433
SFTI-				
1	NTIS (US Sales Only), PC A02/MF A01	DE83702878	MN -20	8:45155
SI-R-				
800303-WD-1	NTIS (US Sales Only), PC A02/MF A01	DE83750793	MN -92a	8:43278
800303-WD-2	NTIS (US Sales Only), PC A02/MF A01	DE83750794	MN -92a	8:43279
800303-WD-3	NTIS (US Sales Only), PC A02/MF A01	DE83750795	MN -92a	8:43280
800303-WD-4	NTIS (US Sales Only), PC A02/MF A01	DE83750796	MN -92a	8:43281
800303-WD-5	NTIS (US Sales Only), PC A02/MF A01; 1	DE83750797	MN -92a	8:43282
810314-1	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750847	MN -61a	8:43510
SLAC/AP-				
1	NTIS, PC A02/MF A01	DE83015082	MN -28	8:44506
2	NTIS, PC A02/MF A01	DE83015081	MN -28	8:44507
3	NTIS, PC A02/MF A01; 1	DE83015080	MN -28	8:44554
5	NTIS, PC A02/MF A01	DE83014762	MN -28	8:44479
SLAC-PUB-				
3143	NTIS, PC A02/MF A01; 1	DE83015086	MN -38	8:44434
3153	NTIS, PC A02/MF A01	DE83014918	MN -41	8:45060
SLAC-Trans-				
203	NTIS, PC A02/MF A01	DE83014472	MN -28	8:44556
SNV-PM-				
1493	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750770	MN -90i	8:43242
SOL-				
83-5	NTIS, PC A04/MF A01; 1	DE83014641	MN -32	8:45313
SP-RAPP-				
1982-18	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750776	MN -59c	8:43647
SRC-C-				
805-48-C-81	NTIS (US Sales Only), PC A06/MF A01	DE83701832	MN -70	8:43395
STU-				
78-7007	NTIS (US Sales Only), PC A04/MF A01; 1	DE83750768	MN -95f	8:44689
SVF-				
99	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750781	MN -13	8:44812
121	NTIS (US Sales Only), PC A05/MF A01; 1	DE83750764	MN -11	8:44745
126	NTIS (US Sales Only), PC A03/MF A01	DE83750773	MN -25	8:44198
129	NTIS (US Sales Only), PC A09/MF A01; 1	DE83750774	MN -90a	8:43264
SWRI-				
7080	*See* DOE/NASA/0287-1	DE83015325	STD -96	8:44127
TE-				
4228-97-79	NTIS, PC A09/MF A01; 1	DE81029286	MN -95f	8:44104
TRI-PP-				
83-45	NTIS (US Sales Only), PC A02/MF A01	DE83902880	MN -34D	8:44480
TRITA-PFU-				
82-06	NTIS (US Sales Only), PC A03/MF A01	DE83701062	MN -34A	8:45258
TS-				
831-1-Vol.1	*See* NUREG/CR-3363-Vol.1	DE83902887	MN -38	8:44429
831-2-Vol.2	*See* NUREG/CR-3363-Vol.2	DE83902888	MN -38	8:44430
TULEA-				
1980-14	NTIS (US Sales Only), PC A03/MF A01; 1	DE83750777	MN -94a	8:43975

Report No.	Availability	Order No.	Distribution Category	Abstract No.
TVA/OACD-				
83/ 6	NTIS, PC A04/MF A01	DE83902236	MN -13	8:44009
UCAR-				
10042-82	NTIS, PC A06/MF A01; 1	DE83002653	STD -20	8:45259
UCID-				
18852-Rev.1	NTIS, PC A03/MF A01; 1	DE83015414	MN -32	8:45314
19457	*See* NUREG/CR-2915(83)	DE83009775	MN -78	8:43939
19752	NTIS, PC A03/MF A01	DE83015174	MN -38	8:44447
19806	NTIS, PC A03/MF A01	DE83014907	MN -32	8:45315
19808	NTIS, PC A05/MF A01; 1	DE83015191	MN -20b	8:45260
19821	NTIS, PC A03/MF A01	DE83014908	MN -32	8:45316
19829	NTIS, PC A02/MF A01	DE83014933	MN -11	8:44690
19833	NTIS, PC A02/MF A01	DE83015456	MN -4	8:44244
19838	NTIS, PC A02/MF A01	DE83014777	MN -25	8:44443
UCLA-ENG-				
83-21	NTIS, PC A06/MF A01	DE83014940	MN -38	8:43511
UCRL-				
15534	NTIS, PC A03/MF A01; 1	DE83014868	MN -11	8:44727
15537	NTIS, PC A02/MF A01	DE83014838	MN -21	8:45261
15541	NTIS, PC A04/MF A01; 1	DE83014843	MN -38	8:44644
51444-82	NTIS, PC A05/MF A01	DE83013697	STD -11	8:44691
53047	*See* NUREG/CR-3132	DE83015453	MN -78	8:43877
53420	NTIS, PC A20/MF A01	DE83015201	MN -21	8:44401
53423	NTIS, PC A08/MF A01	DE83015452	MN -11	8:44692
86245	NTIS, PC A02/MF A01	DE83014845	MN -80	8:43952
87700	NTIS MF A01; 2	DE83014869	MN -20b	8:45262
88257	NTIS, PC A03/MF A01	DE83014961	MN -48	8:44801
88516	NTIS, PC A02/MF A01	DE83006612	MN -11	8:44693
88536	NTIS, PC A02/MF A01; 1	DE83014841	MN -37	8:44454
88635	NTIS, PC A02/MF A01	DE83014844	MN -34A	8:44199
88639	NTIS, PC A02/MF A01	DE83014941	MN -37	8:44455
88870	NTIS, PC A02/MF A01	DE83015058	MN -34A	8:44200
88872	NTIS, PC A03/MF A01	DE83014950	MN -10	8:45263
88901	NTIS, PC A02/MF A01	DE83015455	MN -34A	8:44201
88917	NTIS, PC A02/MF A01	DE83014943	MN -37	8:44645
89010	NTIS, PC A02/MF A01	DE83015454	MN -90c	8:43186
89016	NTIS, PC A02/MF A01	DE83014947	MN -21	8:45264
89161	NTIS, PC A03/MF A01; 1	DE83014948	MN -11	8:44815
89336	NTIS, PC A02/MF A01; 1	DE83014842	MN -34C	8:44977
89383	NTIS, PC A02/MF A01	DE83014839	MN -32	8:45317
89396	NTIS, PC A02/MF A01	DE83014952	MN -21	8:45265
UCRL-Trans-				
11695	NTIS, PC A03; 3	DE81027177	ND -78	8:43967
11838	NTIS, PC A02/MF A01	DE83011249	MN -48	8:44347
11880	NTIS, PC A02/MF A01; 1	DE83014515	MN -4	8:44344
11887	NTIS, PC A02/MF A01; 1	DE83015342	MN -34	8:44409
UFRJ-COPPE-PEN-				
113	NTIS (US Sales Only), PC A03/MF A01	DE83702143	MN -80	8:43865
114	NTIS (US Sales Only), PC A03/MF A01	DE83702142	MN -80	8:43953
UJV-				
6143-T	NTIS (US Sales Only), PC A04/MF A01	DE83702155	MN -79	8:43814
6144-T	NTIS (US Sales Only), PC A04/MF A01	DE83702156	MN -79	8:43815
6145-T	NTIS (US Sales Only), PC A05/MF A01	DE83702157	MN -79	8:43816
UM-P-				
81/ 86	NTIS (US Sales Only), PC A03/MF A01	DE83701055	MN -34D	8:45082
82/ 37	NTIS (US Sales Only), PC A03/MF A01	DE83701056	MN -34D	8:44949
82/ 40	NTIS (US Sales Only), PC A02/MF A01	DE83701063	MN -34A	8:44646
82/ 50	NTIS (US Sales Only), PC A06/MF A01	DE83701064	MN -34B	8:44827
UNI-SA-				
114	NTIS, PC A02/MF A01; 1	DE83015300	MN -80	8:43788
USGS-OFR-				
79-662	Geological Survey Open File Service, Box 25425, Denver Federal Center, Denver, CO 80225		MN -66c	8:43658
USIP-				
82-04	NTIS (US Sales Only), PC A02/MF A01	DE83750852	MN -98	8:43985
UTNL-R-				
0092	NTIS (US Sales Only), PC A06/MF A01	DE83780865	MN -20	8:45269
WAESD-TR-				
83-1005	*See* DOE/JPL/955909-83/10	DE83014438	STD -63b	8:43495
Y/DK-				
345	NTIS, PC A02/MF A01	DE83013565	MN -4	8:44328
Y/DL-				
759	NTIS, PC A04/MF A01	DE83014538	MN -32	8:45318
Y/DW-				
406	NTIS, PC A03/MF A01; 1	DE83015060	MN -37	8:43413
ZfK-				
484	NTIS (US Sales Only), PC A02/MF A01; 1	DE83751082	MN -38	8:44435
ZJE-				
262	NTIS (US Sales Only), PC A02/MF A01; 1	DE83902481	MN -80	8:43852
ZPR-TM-				
444	NTIS, PC A03/MF A01; 1	DE83014537	MN -79d	8:43817

ORDER NUMBER CORRELATION

This correlation list is provided for those organizations where document storage is alphanumeric by report number and request may be received by order number. For other information about a document (abstract number, distribution category, availability, and price), please refer to the Report Number Index.

Order No.	*Report No.*
DE81023084	DOE/RG/10446—T3
DE81027177	UCRL-Trans—11695
DE81027500	DOE/PC/30022—2
DE81028604	DOE/MC/16221—T2
DE81029286	TE—4228-97-79
DE81030265	DOE/ET/10386—T1-Vol.2
DE81030709	SAND—81-1405C
DE82002424	DOE/ET/12478—T1
DE82004275	CW-WR—76-015.49A
DE82021362	ORNL-tr—4875
DE82021979	CONF-800972—
DE83001770	OA-tr—1863
DE83002653	UCAR—10042-82
DE83005675	CONF-721002—
DE83006612	UCRL—88516
DE83007555	LA-UR—83-399
DE83008147	DOE/CE/40590—T1
DE83008150	DOE/CS/28701—T1
DE83008314	DOE/CS/30211—01
DE83008315	BDX—613-2920
DE83008706	DOE/ET/20597—T11
DE83008776	DOE/ER/06036—T1
DE83009108	SERI/STR—231-1745
DE83009109	SERI/TR—231-1714
DE83009394	SERI/TR—231-1926
DE83009532	GTFR—37
DE83009549	GTFR—40
DE83009775	NUREG/CR—2915(83)
DE83010915	DOE/ER/10653—T1
DE83011249	UCRL-Trans—11838
DE83011310	DOE/GJ/01664—T4
DE83011405	DOE/MC/14273—1411
DE83011612	DOE/CS/15013—T1
DE83011697	DOE/FE/05147—T16
DE83011720	DOE/FE/05147—T17
DE83011874	DOE/MC/16049—T7
DE83011966	SERI/TP—252-1922
DE83011967	SERI/STR—231-1860
DE83011968	SERI/TP—214-1976
DE83011969	SERI/STR—231-1910
DE83011977	SERI/TP—212-1970
DE83011978	SERI/TP—211-1952
DE83012085	DOE/ER/70294—T1
DE83012243	CONF-8208141—
DE83012279	DOE/ET/14882—1412
DE83012428	PPPL—2001
DE83012575	DOE/ET/10415—T6
DE83012608	DOE/MC/19403—2
DE83012641	CONF-830406—63
DE83012866	DPSPU—83-30-4-Rev.
DE83013060	DOE/ET/10204—1401
DE83013068	EPRI-AP—3006
DE83013078	DOE/MC/14593—1416
DE83013079	NLCO-tr—16
DE83013083	NLCO-tr—17
DE83013287	SAN—1568-78/4(Vol.2)
DE83013366	PNL-SA—11306
DE83013389	CSS/CI—83-06
DE83013483	DOE/ET/15426—T25
DE83013565	Y/DK—345
DE83013576	DOE/MC/16547—1420
DE83013637	DOE/FE/15081—1
DE83013694	NUREG/CR—2843/3
DE83013697	UCRL—51444-82
DE83013717	DOE/ER/10641—1
DE83013778	NUREG/CR—0200-Vol.1-R2
DE83013780	NUREG/CR—0200-Vol.2-Rev.1
DE83013802	ORNL-tr—4990
DE83013809	K-Trans—197
DE83013833	PNL-SA—11145
DE83013865	LA-UR—83-1839
DE83013883	DOE/FE/15081—T1
DE83013962	DOE/ER/03230—T2
DE83013964	LF-tr—127
DE83013984	DOE/CS/24416—T1
DE83013990	SAND—83-1433C
DE83013991	SAND—82-1937C
DE83013993	SAND—83-0653C
DE83013999	PNL-SA—9661
DE83014000	PNL-SA—10092
DE83014007	CONF-8206205—1
DE83014022	DOE/PR/06010—T32
DE83014057	CONF-830671—1
DE83014058	CONF-8206201—1-Draft
DE83014059	CONF-8205201—1
DE83014091	ARI-RP—150
DE83014097	PNL-SA—9916
DE83014104	BNL—33010
DE83014106	K-Trans—209
DE83014109	K-Trans—187
DE83014116	K-Trans—214
DE83014118	LA-UR—83-1724
DE83014121	LA-UR—83-1746
DE83014128	K-Trans—211
DE83014139	LA-UR—83-1851
DE83014140	LA-UR—83-1854
DE83014151	LA-UR—83-1808
DE83014183	DOE/BP—143
DE83014195	LA-UR—83-1699
DE83014234	DOE/IR/10321—T1
DE83014245	SERI/SP—741-399
DE83014269	DOE/CS/24416—T2
DE83014325	CONF-830566—4
DE83014330	CONF-8211101—1
DE83014337	CONF-830583—3
DE83014348	CONF-830375—1
DE83014355	FHWA/RD—82/167
DE83014366	DPSPU—83-30-3
DE83014379	NYSERDA—82-25-Vol.2
DE83014381	DOE/MC/14705—1429
DE83014424	BNL—33129
DE83014438	DOE/JPL/955909—83/10
DE83014443	BNL—33218
DE83014459	ANL/EES-TM—212-Vol.4
DE83014466	SAND—80-0202
DE83014470	DOE/CS/40240—T1
DE83014472	SLAC-Trans—203
DE83014493	PNL-SA—10738
DE83014515	UCRL-Trans—11880
DE83014527	DOE/SF/90506—1
DE83014534	PNL-SA—9872
DE83014537	ZPR-TM—444
DE83014538	Y/DL—759
DE83014539	DOE/FC/10182—T15
DE83014550	DOE/MC/16441—1423
DE83014577	DOE/ER/71001—T1
DE83014580	NUREG/CR—2884
DE83014588	DOE/NASA/0210—1
DE83014589	DOE/CS/64571—T2
DE83014595	DOE/FE/60173—T1
DE83014611	SAND—83-0697C
DE83014625	CONF-820659—11
DE83014628	DOE/ER/60063—1
DE83014634	DOE/MC/14705—1430
DE83014636	EGG-WM-F—1-83-018
DE83014641	SOL—83-5
DE83014642	PNL-SA—9928
DE83014645	PNL-SA—9157
DE83014647	PNL-SA—10893
DE83014653	CONF-830710—3
DE83014654	CONF-830710—4
DE83014657	DOE/RA/50156—T1
DE83014673	DOE/R5/10299—T2
DE83014681	CONF-830311—182
DE83014687	CONF-820662—6
DE83014711	CONF-830862—1
DE83014716	CONF-820545—23
DE83014717	CONF-8305103—1
DE83014719	DOE/EV/03221—80
DE83014722	DOE/EIA—0202(83/2Q)-1
DE83014724	DOE/CS/30607—T1
DE83014728	DOE/ER/01195—485
DE83014734	CONF-8305103—2
DE83014736	CONF-830233—1
DE83014737	CONF-8305104—1
DE83014738	CONF-8305104—2
DE83014743	CONF-830439—11
DE83014745	CONF-830672—1
DE83014746	CONF-830446—5
DE83014751	DOE/ET/20624—T4
DE83014761	CONF-8210120—
DE83014762	SLAC/AP—5
DE83014763	BNL—33272
DE83014764	BNL—33273
DE83014765	DOE/EV/04625—T3
DE83014769	BNL—33292
DE83014770	BNL—33263
DE83014773	LA—9815-C
DE83014774	LA—4037-SOP-Rev.2-Suppl.1
DE83014775	LA—9813-PR
DE83014776	LA—9698-MS
DE83014777	UCID—19838
DE83014779	SAND—83-1608C
DE83014780	FERMILAB-Conf—83/54-THY/EXP
DE83014783	PNL-TR—424
DE83014791	SAND—83-1192
DE83014792	SAND—83-1119
DE83014793	SAND—82-0525
DE83014794	LBL—16272
DE83014796	SAND—83-0166
DE83014797	LBL—15305
DE83014798	LA—9781-M
DE83014799	DOE/DP/00539—049
DE83014800	LA—9510-MS
DE83014801	LA—9755-PR
DE83014802	LA—9655-MS
DE83014803	LA—9687-MS
DE83014804	LA—9777-MS
DE83014805	LA—9666-PR
DE83014806	LA—9350-M
DE83014807	LA—9752-MS
DE83014808	EGG—2208

Order No.	Report No.
DE83014810	DOE/UMT—0265
DE83014822	LA—9804-MS
DE83014823	GJBX—31-83-Vol.2A-DB
DE83014824	GJBX—31-83-Vol.2A-DC
DE83014825	GJBX—31-83-Vol.2A-DD
DE83014826	GJBX—31-83-Vol.2C-DA
DE83014827	DOE/ER/60029—2
DE83014829	PEP-NOTE—372
DE83014830	PEP-NOTE—373
DE83014831	PEP-NOTE—374
DE83014833	DOE/DP/40152—T1
DE83014834	CONF-830666—3
DE83014837	DOE/DP/40124—6
DE83014838	UCRL—15537
DE83014839	UCRL—89383
DE83014841	UCRL—88536
DE83014842	UCRL—89336
DE83014843	UCRL—15541
DE83014844	UCRL—88635
DE83014845	UCRL—86245
DE83014846	GJO—100(83)
DE83014847	GJBX—31-83-Vol.2B-DA
DE83014848	GJBX—31-83-Vol.2B-DB
DE83014849	GJBX—31-83-Vol.2B-DC
DE83014850	GJBX—31-83-Vol.2B-DD
DE83014851	GJBX—31-83-Vol.2C-DB
DE83014852	GJBX—31-83-Vol.1
DE83014853	GJBX—30(83)
DE83014855	SAND—81-7206
DE83014856	LBL—14914-Rev.
DE83014857	DOE/R5/10299—T3
DE83014861	LBL—15676
DE83014862	LBL—15381
DE83014864	LBL—14202
DE83014865	LBL—16241
DE83014868	UCRL—15534
DE83014869	UCRL—87700
DE83014873	GJBX—31-83-Vol.2A-DA
DE83014874	PNL-SA—7279
DE83014875	GEND-INF—11-Vol.3
DE83014876	BNL—33166
DE83014877	DOE/ET/10373—T10
DE83014879	NLCO—1192
DE83014880	DOE/NV/10162—9
DE83014881	DOE/NV/10162—8
DE83014882	DOE/NV/10162—7
DE83014883	DOE/NV/10162—4
DE83014884	DOE/ET/53088—96
DE83014885	PNL—4659
DE83014886	DOE/S—0020/1
DE83014887	ORNL/TM—8771
DE83014888	ORNL/FMP—83/2
DE83014889	ORNL/CSD—120
DE83014890	ORNL/TM—8234
DE83014891	ORNL/TM—8601
DE83014892	ORNL/TM—8699
DE83014893	EDFB/IBP—77/5
DE83014894	COO—2566-24
DE83014895	DOE/NASA/9235—75/2
DE83014900	LBL—16042
DE83014901	LBL—16190
DE83014902	LBL—16135
DE83014903	LBL—16197
DE83014904	LBL—16171
DE83014906	PNL—4488
DE83014907	UCID—19806
DE83014908	UCID—19821
DE83014911	LBL—15227
DE83014913	PPPL—2009
DE83014914	PPPL—2018
DE83014915	PPPL—2013
DE83014916	PPPL—1939
DE83014917	PPPL—2003
DE83014918	SLAC-PUB—3153
DE83014919	LBL—12469
DE83014920	EGG-M—14682
DE83014921	DOE/CS/51294—01
DE83014922	DOE/CS/51294—01-Annex-A
DE83014926	DOE/R5/10325—T2
DE83014927	DOE/CE—0033-1
DE83014929	GA-A—17000
DE83014932	ORAU/IEA—83-5(M)
DE83014933	UCID—19829
DE83014935	SAND—83-8231
DE83014939	NUREG/CR—3289
DE83014940	UCLA-ENG—83-21
DE83014941	UCRL—88639
DE83014943	UCRL—88917
DE83014945	PNL-SA—9566
DE83014947	UCRL—89016
DE83014948	UCRL—89161
DE83014950	UCRL—88872
DE83014952	UCRL—89396
DE83014954	EGG-M—11183
DE83014956	EGG-M—01683
DE83014957	EGG-M—02283
DE83014960	EGG—2265
DE83014961	UCRL—88257
DE83014962	DOE/ER/10603—T2
DE83014965	EGG-M—26182
DE83014966	LBL—16131
DE83014967	NUREG/CR—2475
DE83014972	DOE/ET/11304—T8
DE83014980	PNL-SA—9981
DE83014981	DOE/ER/03518—105
DE83014982	DOE/ER/03518—107
DE83014986	DOE/ER/01367—146
DE83014991	LBL—3220-Vol.1
DE83014996	DOE/ER/06034—T7
DE83014999	DOE/EIA—0167(82)P
DE83015001	NUREG/CR—3161
DE83015020	PNL—4770
DE83015022	PNL—4734
DE83015025	DOE/ER/10766—T2
DE83015026	DOE/ER/04996—4
DE83015028	RFP-ABST—09
DE83015031	DOE/EV/04568—35
DE83015032	RFP-Trans—406
DE83015033	ORNL/TM—5286
DE83015034	NUREG/CR—3122
DE83015035	DOE/ER/10750—T1
DE83015037	DOE/ER/03158—108
DE83015038	NUREG/CR—2938
DE83015040	ORNL-tr—4994
DE83015041	ORNL-tr—5033
DE83015044	NUREG/CR—3359-Vol.1
DE83015045	DOE/NBM—3015045
DE83015050	DOE/PETC/QTR—83/2
DE83015051	BNL—33058
DE83015052	BNL—33259
DE83015054	DOE/ES—0003/1
DE83015057	DOE/ET/20218—T1
DE83015058	UCRL—88870
DE83015060	Y/DW—406
DE83015063	DOE/CS/20531—T3
DE83015064	DOE/CS/20531—T4
DE83015065	DOE/CS/20531—T1
DE83015066	DOE/CS/20531—T6
DE83015067	DOE/CS/20531—T2
DE83015069	DOE/CS/20531—T5
DE83015072	ORNL/FEDC—83/1
DE83015073	ORNL/TM—8747
DE83015075	PNL-SA—9992
DE83015076	PNL-SA—9709
DE83015078	PNL-SA—10508
DE83015079	RHO-BW-SA—271P
DE83015080	SLAC/AP—3
DE83015081	SLAC/AP—2
DE83015082	SLAC/AP—1
DE83015083	PEP-NOTE—378
DE83015084	PEP-NOTE—377
DE83015085	PEP-NOTE—375
DE83015086	SLAC-PUB—3143
DE83015088	PNL-SA—10818
DE83015089	PNL-SA—9668
DE83015090	PNL-SA—9839
DE83015091	PNL-SA—9720
DE83015093	PNL-SA—9729
DE83015094	PNL-SA—11299
DE83015095	PNL-SA—9619
DE83015096	PNL-SA—10433
DE83015097	PNL-SA—9575
DE83015100	SAND—82-1951C
DE83015102	SAND—82-1952C
DE83015103	SAND—83-0479C
DE83015105	SAND—83-1300C
DE83015107	SAND—83-0672C
DE83015112	SAND—83-1601C
DE83015116	DOE/ER/53131—4
DE83015119	EGG-M—01183
DE83015120	EGG-M—17282
DE83015121	EGG-M—28682
DE83015122	MTR—82W73
DE83015123	MTR—82W159
DE83015124	MTR—82W79
DE83015125	EGG-M—01883
DE83015126	EGG-M—30982
DE83015129	DOE/MC/19239—1422
DE83015136	EGG-M—08983
DE83015138	EGG-M—02683
DE83015139	EGG-M—09883
DE83015140	EGG-M—09783
DE83015142	EGG-M—20082
DE83015146	DOE/SR/00952—T5
DE83015147	DOE/OR/00033—T6
DE83015148	DOE/RA—23215
DE83015149	BNL—33149
DE83015150	DOE/EV/10673—T2
DE83015155	DOE/CS/24436—T1
DE83015167	DOE/SF/11549—T1
DE83015172	DOE/JPL/956205—83/4
DE83015174	UCID—19752
DE83015175	ONWI—481
DE83015176	DOE/UMT—0064
DE83015177	LA—9796-MS
DE83015178	LA—9761-MS
DE83015180	PNL—4725
DE83015181	DOE/NASA/3194—1
DE83015182	BNL—51627
DE83015183	NUREG/CR—2000-Vol.2-No.6
DE83015186	DOE/SR/00952—T6
DE83015187	DOE/SR/00952—T7
DE83015189	SAND—83-0537C
DE83015191	UCID—19808
DE83015192	DOE/ER/10457—4
DE83015193	DOE/ER/53140—9
DE83015194	DOE/EIA—0395
DE83015195	NUREG/CR—3221
DE83015196	DOE/OR/00033—T25
DE83015198	BNL—33324
DE83015201	UCRL—53420
DE83015205	SAND—83-0772C
DE83015206	SAND—83-0801C
DE83015207	SAND—83-0536C
DE83015208	SAND—83-0443C
DE83015264	DOE/EIA—0125(83/1Q)
DE83015266	DOE/R5/10325—T1
DE83015268	DOE/EV/10673—T1
DE83015272	DOE/NASA/0175—1-Vol.1
DE83015273	DOE/NASA/0175—1-Vol.2
DE83015274	DOE/NASA/0175—1-Vol.3
DE83015275	DOE/NASA/0175—1-Vol.4
DE83015280	DOE/MC/10737—1436
DE83015281	DOE/ET/14928—1437
DE83015282	DOE/ET/14928—1438
DE83015283	LBL—14938
DE83015293	GA—A16992
DE83015294	DOE/ID/01756—2
DE83015296	NMEI—61-26
DE83015299	PNL-SA—9501
DE83015300	UNI-SA—114
DE83015303	DOE/NV/10162—5
DE83015306	HEDL-TME—83-17
DE83015307	DOE/NASA/12726—20
DE83015308	DOE/NASA/51044—30
DE83015309	DOE/RA/23214—1
DE83015310	EML—415
DE83015311	SAND—82-2280
DE83015313	GEFR—00622
DE83015314	ONWI—242
DE83015324	ONWI—169
DE83015325	DOE/NASA/0287—1
DE83015326	DOE/NE—0052
DE83015327	DOE/ET/34031—13
DE83015328	DOE/NBB—0037
DE83015331	DOE/ER/10960—3
DE83015332	DOE/SF/00515—T16
DE83015333	DOE/SF/00515—T10
DE83015334	DOE/SF/00515—T15
DE83015335	DOE/SF/00515—T13
DE83015338	DOE/SF/00515—T12
DE83015341	DOE/SF/00515—T11
DE83015342	UCRL-Trans—11887
DE83015348	DOE/ET/10617—T1

Order No.	Report No.
DE83015353	BDX—613-2957
DE83015355	LBL—15526
DE83015356	LBL—16152
DE83015357	SAND—82-1730
DE83015358	PNL—4764
DE83015359	ONWI—390
DE83015360	DOE/MC/10865—13
DE83015361	ONWI—467-Vol.2
DE83015362	ONWI—467-Vol.1
DE83015380	DOE/MC/08383—45-Vol.2
DE83015381	DOE/MC/08383—45-Vol.1
DE83015382	DOE/ER/04998—T2
DE83015397	DOE/EIA—0412
DE83015402	GJBX—17(83)
DE83015405	DP-MS—83-7
DE83015411	NUREG/CR—3085-Vol.3
DE83015414	UCID—18852-Rev.1
DE83015415	SAND—83-1058
DE83015416	LBL—12520
DE83015417	LBL—11654
DE83015419	ONWI—480
DE83015420	DOE/UMT—0263
DE83015422	CONF-830654—
DE83015423	DOE/NE—0051
DE83015424	DOE/ET/51013—80
DE83015425	DOE/EIA—0380(83/06)
DE83015427	DOE/EIA—0398
DE83015431	PNL-SA—9530
DE83015435	NUREG/CR—2599
DE83015436	PNL-SA—10750
DE83015437	NUREG/CR—2957
DE83015439	DOE/DP/40133—1
DE83015440	EGG-M—11883
DE83015441	EGG—M-11983
DE83015442	EGG-M—06483
DE83015443	EGG-M—09983
DE83015444	EGG-M—11783
DE83015445	EGG-M—14882
DE83015452	UCRL—53423
DE83015453	NUREG/CR—3132
DE83015454	UCRL—89010
DE83015455	UCRL—88901
DE83015456	UCID—19833
DE83015457	SAND—83-0414
DE83015458	DOE/NE/33080—T1
DE83015463	DOE/JPL/955567—83-11
DE83015542	DOE/SR/00952—T10
DE83015543	DOE/SR/00952—T9
DE83015544	DOE/SR/00952—T8
DE83015549	FE—2346-8
DE83015551	DLCS—5000183
DE83015552	DOE/SR/00952—T1
DE83015555	DOE/SR/00952—T4
DE83015556	DOE/SR/00952—T2
DE83015563	RHO-BWI-LD—29
DE83015572	DOE/ER/04998—T3
DE83015573	DOE/ER/10759—3
DE83015576	DOE/ER/10362—T2
DE83015577	DOE/ER/60000—T1
DE83015582	DOE/SR/00952—T3
DE83015588	SAND—83-0794
DE83015594	DOE/ET/53004—51
DE83015595	LA—9824-MS
DE83015596	LA—9325-MS
DE83015631	SAND—82-2115
DE83015632	SAND—83-7100
DE83015633	SAND—83-0280
DE83015634	SAND—83-0278
DE83015635	SAND—83-1110
DE83015636	DOE/BC/10116—20
DE83015637	SAND—82-2980
DE83015638	ORAU/IEA—83-7(M)
DE83015643	NUREG/CR—3283
DE83015644	NUREG/CR—3241
DE83015645	NUREG/CR—3315
DE83015647	IDO—10057(82)
DE83015651	DOE/NE/37900—2
DE83015652	DOE/NE/37900—1
DE83015655	DOE/NE/37900—3
DE83015660	NUREG/CR—3333
DE83015661	NUREG/CR—3278
DE83015663	NUREG/CR—3175
DE83015665	EGG—2262
DE83015666	IDO—10086(82)
DE83015674	RFP—3357

Order No.	Report No.
DE83015722	LBL—12574
DE83015723	DOE/CS/22804—2
DE83015724	SAND—83-0964
DE83015725	LBL—11829
DE83015739	DOE/EV—0005/39
DE83015740	ANL—83-3
DE83015742	ANL/EES-TM—224
DE83015746	ORNL/SUB—82/69604/1
DE83015748	ANL—83-56
DE83015753	ANL—83-43
DE83015754	ORNL/TM—8798
DE83015768	ANL/EES-TM—227-Vol.2
DE83015812	DOE/MC/14373—T1
DE83015917	ONWI—391
DE83015918	ONWI—392
DE83701054	JINR—E-4-81-778
DE83701055	UM-P—81/86
DE83701056	UM-P—82/37
DE83701057	FIAS-R—106
DE83701058	LUIP—8207
DE83701059	LUIP—8206
DE83701060	NFL—34
DE83701061	RISO-M—2344
DE83701062	TRITA-PFU—82-06
DE83701063	UM-P—82/40
DE83701064	UM-P—82/50
DE83701795	NRCN—514
DE83701796	AEEW-R—1506
DE83701797	AEEW-R—1529
DE83701798	AEEW-R—1531
DE83701800	CEA-CONF—6353
DE83701801	CEA-CONF—6371
DE83701802	CEA-CONF—6375
DE83701803	CEA-CONF—6391
DE83701804	ND-R—610(s)
DE83701806	AECL—7519
DE83701807	AECL—7606
DE83701808	AECL—7687
DE83701809	IAEA-R—2547-F
DE83701810	CEA-CONF—6355
DE83701811	AECL—7688
DE83701812	CEA-CONF—6166
DE83701813	CEA-CONF—6359
DE83701814	CEA-R—5176
DE83701815	JEN—518
DE83701816	JEN—521
DE83701817	KFKI—1982-41
DE83701818	KFKI—1982-45
DE83701819	NRCN(TN)—044
DE83701820	SAAS—293
DE83701821	CEA-CONF—6394
DE83701822	CEA-N—2301
DE83701823	RL—82-038
DE83701825	CEA-CONF—6278
DE83701829	AECL—6834
DE83701830	AECL—7685
DE83701832	SRC-C—805-48-C-81
DE83701833	AECL—7086
DE83701835	AECB—1184
DE83701836	AECB—1187
DE83701837	OEFZS—4179
DE83702069	IAEA-R—1896-F
DE83702070	IAEA-R—2618-F
DE83702071	CEA-CONF—6402
DE83702072	DSN—559
DE83702073	OEFZS—4154
DE83702074	CEA-CONF—6414
DE83702075	CEA-R—5181
DE83702076	CEA-CONF—6456
DE83702077	CEA-CONF—6457
DE83702078	CEA-CONF—6458
DE83702079	CEA-CONF—6474
DE83702080	CEA-CONF—6484
DE83702081	RL—82-036
DE83702082	INP—1089/B
DE83702083	INP—1090/B
DE83702084	INP—1091/B
DE83702085	IAEA-RL—92(Rev.82)
DE83702086	FEI—1229
DE83702087	IAEA-R—2581-F
DE83702088	CEA-CONF—6482
DE83702089	FEI—1158
DE83702090	FEI—1251
DE83702091	FEI—1252
DE83702092	FEI—1261

Order No.	Report No.
DE83702093	JINR-R—8-81-770
DE83702094	IAE—3371/10
DE83702095	JINR—13-82-378
DE83702096	JINR—8-82-250
DE83702097	JINR-R—10-82-368
DE83702098	CTA-EAV-NT—011/82
DE83702099	IFVE-OUNK—82-109
DE83702100	IFVE-OUNK—82-27
DE83702101	JINR—13-82-221
DE83702102	JINR—13-82-254
DE83702103	JINR—13-82-279
DE83702104	JINR—16-82-170
DE83702105	JINR—8-82-169
DE83702106	JINR—9-82-13
DE83702107	JINR—9-82-177
DE83702108	JINR—9-82-188
DE83702109	JINR—9-82-214
DE83702110	JINR—9-82-283
DE83702111	JINR—9-82-284
DE83702112	JINR—9-82-339
DE83702113	JINR—9-82-406
DE83702114	JINR—9-82-416
DE83702115	JINR—9-82-423
DE83702116	JINR—9-82-424
DE83702117	JINR-R—11-82-230
DE83702118	JINR-R—11-82-233
DE83702119	JINR-R—9-82-124
DE83702120	JINR-R—9-82-168
DE83702121	JINR-R—9-82-175
DE83702122	JINR-R—9-82-301
DE83702123	JINR-R—9-82-317
DE83702124	KIYI—81-18
DE83702125	KIYI—81-21
DE83702126	NIIEFA-P-K—0564
DE83702128	CEA-CONF—6434
DE83702129	CEA-CONF—6435
DE83702130	NIIAR—56(509)
DE83702131	CEA-CONF—6455
DE83702132	CEA-R—5182
DE83702133	FEI—1254
DE83702134	FEI—1275
DE83702135	FEI—1294
DE83702136	IAE—3404/5
DE83702137	INDC(YUG)—7
DE83702138	NIIAR—13(528)
DE83702139	NIIAR—53(506)
DE83702140	FEI—1268
DE83702141	LCC—014/82
DE83702142	UFRJ-COPPE-PEN—114
DE83702143	UFRJ-COPPE-PEN—113
DE83702144	IPEN-Pub—41
DE83702145	RBS—3(rev.)
DE83702146	NIIAR—3(518)
DE83702147	CEA-CONF—6459
DE83702148	CEA-CONF—6460
DE83702150	NUCLEBRAS-CDTN—441/82
DE83702152	CEA-CONF—6471
DE83702153	FEI—1257
DE83702154	NIIAR—58(511)
DE83702155	UJV—6143-T
DE83702156	UJV—6144-T
DE83702157	UJV—6145-T
DE83702158	CEA-CONF—6445
DE83702159	IPEN-Pub—43
DE83702160	NIIAR—60(513)
DE83702161	CEA-R—5188
DE83702162	IFVE-OEF—82-115
DE83702163	IFVE-OEIPK—82-122
DE83702164	IFVE-ORI—82-46
DE83702166	ITEF—16(1982)
DE83702167	ITEF—28(1982)
DE83702168	ITEF—33(1982)
DE83702169	JINR—10-82-227
DE83702170	JINR—10-82-232
DE83702171	JINR—10-82-295
DE83702172	JINR—10-82-391
DE83702173	JINR—13-81-722
DE83702174	JINR—13-82-160
DE83702175	JINR—13-82-180
DE83702176	JINR—13-82-199
DE83702177	JINR—13-82-216
DE83702178	JINR—13-82-243
DE83702179	JINR—13-82-350
DE83702180	JINR—13-82-367

Order No.	Report No.
DE83702181	JINR—13-82-397
DE83702182	JINR—16-82-419
DE83702183	JINR—19-82-380
DE83702184	JINR-D—13-82-417
DE83702185	JINR-R—10-82-238
DE83702186	JINR-R—13-82-374
DE83702187	KFTI—82-14
DE83702188	KFTI—82-17
DE83702189	IFVE-OEA-OEIPK—82-15
DE83702190	IFVE-OI—82-10
DE83702191	IFVE-ONF—82-85
DE83702192	JINR—10-82-392
DE83702193	JINR—13-82-178
DE83702194	JINR—13-82-264
DE83702195	JINR-R—11-81-784
DE83702196	JINR-R—7-81-744
DE83702197	IFVE-OEF—82-6
DE83702198	AERE-R—10388
DE83702199	JINR-R—10-82-211
DE83702200	ND-R—658(S)
DE83702201	CBPF-CS—002/81
DE83702203	SAAS—295
DE83702204	SAAS—296
DE83702205	JINR—10-82-140
DE83702206	JINR—10-82-144
DE83702207	JINR—10-82-292
DE83702208	JINR-R—10-82-217
DE83702209	JINR-R—14-82-203
DE83702210	IAE—3447/4
DE83702211	IFVE-OMVT—82-71
DE83702212	IFVE-OMVT—82-84
DE83702213	IFVE-OMVT—82-9
DE83702214	JINR—10-82-143
DE83702215	JINR—10-82-158
DE83702216	JINR—10-82-407
DE83702217	JINR—10-82-482
DE83702218	JINR-R—10-82-105
DE83702219	JINR-R—10-82-237
DE83702220	JINR—R-10-82-369
DE83702221	JINR—R-10-82-460
DE83702222	KIYI—81-25
DE83702223	KIYI—81-26
DE83702224	RL—82-071
DE83702225	ANAEM-FR—81
DE83702226	CNAEM-R—218
DE83702227	IPSN-RA—1981
DE83702859	EFI—503(46)-81
DE83702860	IAE—3439/8
DE83702861	IAE—3477/7
DE83702862	IAE—3498/14
DE83702863	IAE—3500/14
DE83702864	IAE—3513/7
DE83702865	IAE—3515/7
DE83702866	IAEA-R—1882-F
DE83702867	ILE—8120P
DE83702868	ILE—8123P
DE83702869	ILE—8125P
DE83702870	ILE—8126P
DE83702871	ILE—8132P
DE83702872	INDC(NDS)—136/GA
DE83702873	INT—156/J
DE83702874	IPPCZ—242
DE83702875	IPPJ—550
DE83702876	KFTI—82-1
DE83702877	KFTI—82-12
DE83702878	SFTI—1
DE83703392	CEA-CONF—6590
DE83703393	IC—82/152
DE83703394	IC—82/166
DE83703395	IC—82/72
DE83703396	Rijnhuizen—82-143
DE83703397	Rijnhuizen—82-144
DE83750196	KFK—3386-B
DE83750197	KFK-PDV—215
DE83750198	BMFT-FB-T—82-202
DE83750199	BMFT-FB-T—82-201
DE83750200	BMFT-FB-T—82-198
DE83750201	KFK—3344
DE83750202	GSF-P—207
DE83750203	KFK—3382
DE83750204	KFK—3391
DE83750205	GSI—82-8
DE83750206	KFK—3253
DE83750207	BMFT-FB-T—82-203
DE83750208	KFK—3283
DE83750209	KFK—3256
DE83750210	DESY—82-060
DE83750211	DESY—82-058
DE83750758	DTH-LET-NE—82-1(Pt.1)
DE83750759	DTH-LET-NE—82-1(Pt.2)
DE83750760	DTH-LET-NE—82-1(Pt.3)
DE83750761	RISO-M—2364
DE83750762	MST-LUFT-A—62
DE83750764	SVF—121
DE83750765	NE-SBT—82-30
DE83750766	NE/FBA—82-10
DE83750767	CTH-IE-T—82-104
DE83750768	STU—78-7007
DE83750769	KHM-TR—35
DE83750770	SNV-PM—1493
DE83750771	NE-SBT—81-31
DE83750772	NE-SBT—82-31
DE83750773	SVF—126
DE83750774	SVF—129
DE83750775	NE/FBA—82-14
DE83750776	SP-RAPP—1982-18
DE83750777	TULEA—1980-14
DE83750778	NE-SBT—82-10
DE83750779	NP—3750779
DE83750780	NE-VIND—82-38
DE83750781	SVF—99
DE83750782	NE-VIND—82-45
DE83750783	NE-TFS—82-4
DE83750784	NILU-OR—1/81
DE83750785	NILU-TR—15/81
DE83750786	IFE/KR/E—82/004
DE83750787	IFE/KR/E—6
DE83750788	IFE/KR/E—10
DE83750789	IFE/KR/E—16
DE83750790	IFE/KR/E—9
DE83750791	NP—3750791
DE83750792	NILU-OR—17/81-ES
DE83750793	SI-R—800303-WD-1
DE83750794	SI-R—800303-WD-2
DE83750795	SI-R—800303-WD-3
DE83750796	SI-R—800303-WD-4
DE83750797	SI-R—800303-WD-5
DE83750844	RISO-R—463
DE83750845	MST-LUFT-A—55
DE83750846	NP—3750846
DE83750847	SI-R—810314-1
DE83750848	NILU-OR—13/81
DE83750849	NILU-OR—19/81
DE83750850	NILU-OR—26/81
DE83750851	NILU-TR—5/82
DE83750852	USIP—82-04
DE83750853	LUTVDG/(TVGL—3012)/1-31/1981
DE83750854	EFN-AES—1982-1
DE83750900	KFK—3325
DE83750901	MPI-PAE/EXTRATERR—169
DE83750902	DESY—83-080
DE83750903	DESY—83-002
DE83750904	DESY—82-086
DE83750905	BMFT-FB-HA—83-005
DE83750906	Juel-Spez—183
DE83750908	KFK—3432
DE83750914	Juel—1808
DE83750915	KFK—3426
DE83750916	HMI-B—383
DE83750917	Juel—1788
DE83750918	GSF-BPT—1/82
DE83750919	GKSS—82/E/43
DE83750920	KFK—3462
DE83750921	GKSS—82/E/44
DE83750922	IKE—2-59
DE83750923	BMFT-FB-T—83-039
DE83750924	KFK—3449
DE83750925	IFP—30-368
DE83750926	CEA-tr—1-739-6
DE83750927	CEA-CONF—6573
DE83750928	CEA-CONF—6591
DE83751034	BMFT-FB-T—83-046
DE83751035	BMFT-FB-T—83-038
DE83751036	BMFT-FB-T—83-055
DE83751037	BMFT-FB-T—83-031
DE83751038	BMFT-FB-T—83-067
DE83751039	BMFT-FB-T—83-068
DE83751040	BMFT-FB-T—83-062
DE83751041	ISI—101907
DE83751042	BMFT-FB-T—83-074
DE83751043	BMFT-FB-T—83-073
DE83751044	BMFT-FB-T—83-078
DE83751045	BMFT-FB-T—83-081
DE83751046	KFK-PFT—50
DE83751077	KFK-PDV—225
DE83751078	Juel—1815
DE83751079	KFK—3523
DE83751080	KFK—3268
DE83751081	SFB—80/E/200
DE83751082	ZfK—484
DE83751154	DFVLR-FB—82-15
DE83751155	BMFT-FB-HA—82-046
DE83751156	BMFT-FB-T—83-134
DE83770001	CONF-8210136—
DE83770002	NP—3770002
DE83770003	NP—3770003
DE83770004	NP—3770004
DE83770005	NP—3770005
DE83770006	NP—3770006
DE83770007	NP—3770007
DE83770008	NP—3770008
DE83770043	NP—3770043
DE83770044	NP—3770044
DE83770045	NP—3770045
DE83770135	NP—3770135
DE83770136	CONF-8209131—1
DE83770137	NP—3770137
DE83770138	CONF-8204117—2
DE83770139	NP—3770139
DE83770140	NP—3770140
DE83770141	NP—3770141
DE83770142	NP—3770142
DE83770143	NP—3770143
DE83770144	NP—3770144
DE83770150	NP—3770150
DE83770180	NP—3770180
DE83770181	NP—3770181
DE83770182	NP—3770182
DE83770183	NP—3770183
DE83770184	CONF-8204117—3
DE83770185	NP—3770185
DE83770186	NP—3770186
DE83770187	NP—3770187
DE83770188	NP—3770188
DE83770189	NP—3770189
DE83770190	NP—3770190
DE83770191	NP—3770191
DE83770192	NP—3770192
DE83770193	NP—3770193
DE83770194	NP—3770194
DE83770195	NP—3770195
DE83770211	ESC—17
DE83770212	ESC—21
DE83770215	Memorandum-M—427
DE83770216	Memorandum-M—422
DE83770217	ESC—1
DE83770219	ESC—5
DE83770220	ESC—5SAM
DE83770221	ESC—18
DE83770230	ESC—16
DE83770231	ESC—20
DE83780850	ER—81-2E
DE83780863	IPPCZ—244
DE83780864	IPPJ-REV—1
DE83780865	UTNL-R—0092
DE83780866	MPE—177
DE83780874	INIS-SU—147
DE83780875	INIS-SU—136
DE83780876	INIS-SU—137
DE83780877	INIS-mf—8024
DE83780878	INIS-mf—7742
DE83780879	INIS-mf—7919
DE83780880	INIS-mf—7983
DE83780881	INIS-mf—7961
DE83780882	INIS-mf—7681
DE83780883	INIS-mf—7687
DE83780884	INIS-mf—7682
DE83780885	INIS-mf—7683
DE83780886	INIS-mf—7680
DE83780887	INIS-mf—7673
DE83780888	INIS-mf—7359
DE83780889	INIS-mf—7642
DE83780890	INIS-mf—7666

Order No.	Report No.
DE83780892	INIS-mf—7672
DE83780893	INIS-mf—7674
DE83780894	INIS-mf—7628
DE83780895	INIS-mf—7629
DE83780896	INIS-mf—7630
DE83780897	INIS-mf—7631
DE83780898	INIS-mf—7632
DE83780899	INIS-mf—7633
DE83780900	INIS-mf—7634
DE83780901	INIS-mf—7638
DE83780902	INIS-mf—7639
DE83780903	INIS-mf—7640
DE83780904	INIS-mf—7641
DE83780905	INIS-mf—7644
DE83780906	INIS-mf—7645
DE83780907	INIS-mf—7647
DE83780908	INIS-mf—7648
DE83780909	INIS-mf—7650
DE83780910	INIS-mf—7652
DE83780911	INIS-mf—7653
DE83780912	INIS-mf—7655
DE83780913	INIS-mf—7659
DE83780914	INIS-mf—7660
DE83780915	INIS-mf—7662
DE83780916	INIS-mf—7663
DE83780917	INIS-mf—7665
DE83780918	INIS-mf—7627
DE83780919	INIS-mf—7649
DE83780920	INIS-mf—7614
DE83780921	INIS-mf—7643
DE83780922	INIS-mf—7651
DE83780923	INIS-mf—7656
DE83780924	INIS-mf—7657
DE83780925	INIS-mf—7664
DE83780926	INIS-mf—7658
DE83780927	INIS-mf—7667
DE83780928	FRNC-TH—1077
DE83780929	INIS-mf—7625
DE83780930	INIS-mf—7635
DE83780931	INIS-mf—7637
DE83780932	INIS-mf—7646
DE83780933	INIS-mf—7654
DE83780934	INIS-mf—7607
DE83780935	INIS-mf—7592
DE83780936	INIS-mf—7594
DE83780937	INIS-mf—7608
DE83780938	INIS-mf—7636
DE83780939	INIS-mf—7670
DE83780991	DESY-L-Trans—270
DE83780992	KFK-tr—682
DE83780993	INS-NUMA—28
DE83780994	KEK—81-2
DE83780995	ARL/TR—050
DE83901723	NZERDC—70-12-82
DE83901725	NZERDC-P—67
DE83901778	NP-tr—3901778
DE83901829	EPRI-AP—2884-SR
DE83901892	NUREG—0824-Final
DE83902215	RISLEY-Trans—4334
DE83902236	TVA/OACD—83/6
DE83902259	NUREG—0904-FINAL
DE83902262	NUREG/BR—0025-Vol.9-No.5
DE83902382	NP—3902382
DE83902447	NUREG/CP—0044-Vol.2
DE83902448	NUREG/CP—0044-Vol.1
DE83902474	NP—3902474
DE83902481	ZJE—262
DE83902485	CERN-EP—82-39
DE83902502	CERN—EP/82-29
DE83902518	NP—3902518
DE83902531	NUREG/CR—2595
DE83902550	CONF-8209149—8
DE83902554	CONF-810298—
DE83902561	CONF-8209149—9
DE83902562	CONF-8209149—7
DE83902565	CONF-8209149—4
DE83902566	CONF-8209149—3
DE83902588	EPRI-NP—3062
DE83902594	EPRI-EL—3106-Vol.3
DE83902598	EPRI-EL—2835-Vol.4
DE83902605	FOA-C—20443-T1
DE83902608	IA—1374
DE83902853	NUREG—0896-Suppl.2
DE83902870	NUREG—0580-Vol.12-No.6
DE83902871	NUREG—0825-Final
DE83902872	NUREG—0750-Vol.16-No.3
DE83902873	NUREG—1011
DE83902874	NUREG—0040-Vol.7-No.2
DE83902876	NZERDC—90
DE83902880	TRI-PP—83-45
DE83902882	NUREG—0485-Vol.5-No.6
DE83902887	NUREG/CR—3363-Vol.1
DE83902888	NUREG/CR—3363-Vol.2
DE83902890	NUREG—0826-Final

Abbreviations Used in Availability Column

EM Available in aperture card format only. Inquiries regarding the availability of these items should be addressed to USDOE-TIC, P.O. Box 62, Oak Ridge, Tennessee, 37830.

ETEC Available *only to requesters within the United States* from the Energy Technology Engineering Center, P.O. Box 1449, Canoga Park, California 91304.

GJO Available from DOE Grand Junction Office, P.O. Box 2567, Grand Junction, Colorado 81501.

GPO For sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

HMSO Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London, England, EC1P 1BN.

NSO Available *only to requesters within the United States* from the Nuclear Standards Office, Oak Ridge National Laboratory, P.O. Box X, Oak Ridge, Tennessee 37830.

NTIS For sale by the National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, Virginia 22161. Price given is the domestic price for paper copy; prices for foreign purchasers are in most instances twice the domestic price.

TIC Available from the Technical Information Center, P.O. Box 62, Oak Ridge, Tennessee 37830.

NTIS NORTH AMERICAN PRICE CODES

Most NTIS products and services are now announced by price codes and, therefore, without specific prices in NTIS journals, newsletters and indexes.

The current dollar equivalent for each code is shown in the schedule below. Orders must list the accession number(s) and be accompanied by the total dollar amount from the current schedule.

NORTH AMERICAN CONTINENT PRICE SCHEDULE

Customers in Canada, United States, and Mexico please use this price schedule; other addressees, write for Folder PR-360-4.

MICROFICHE					
A01	$4.50	E01	$6.50	T01	$125.00
PAPER COPY		E02	7.50	T02	140.00
A02	7.00	E03	9.50	T03	240.00
A03	8.50	E04	11.50	T04	330.00
A04	10.00	E05	13.50	T05	400.00
A05	11.50	E06	15.50	T06	465.00
A06	13.00	E07	17.50	T07	530.00
A07	14.50	E08	19.50	T08	595.00
A08	16.00	E09	21.50	T09	660.00
A09	17.50	E10	23.50	T10	725.00
A10	19.00	E11	25.50	T11	790.00
A11	20.50	E12	28.50	T12	855.00
A12	22.00	E13	31.50	T13	920.00
A13	23.50	E14	34.50	T14	985.00
A14	25.00	E15	37.50	T15	1,050.00
A15	26.50	E16	40.50	T16	1,115.00
A16	28.00	E17	43.50	T17	1,180.00
A17	29.50	E18	46.50	T18	1,245.00
A18	31.00	E19	51.50	T19	1,310.00
A19	32.50	E20	61.50	T99	**
A20	34.00	E99	**		
A21	35.50	M01	35.00		
A22	37.00	M02	40.00		
A23	38.50				
A24	40.00				
A25	41.50				
A99	*				

*Add $1.50 for each additional 25-page increment, or portion thereof.
**Contact NTIS for price quote.

PRICES EFFECTIVE JANUARY 1, 1983

U.S. DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

CODES USED ON INDEX LINES

Following the citation numbers in the Corporate Author, Personal Author, and Subject Indexes, codes are used to designate the type of document, country of publication, and language of the document, e.g., (R:SU:In Russian). The language designator does not appear if the document is published in English.

DOCUMENT TYPES

J	Journal article
TJ	Translation of a journal article
R	Report
RA	Report analytic
B	Book
BA	Book analytic
P	Patent
E	Engineering materials
D	Thesis or dissertation
TG	Translation (general)
TA	Translation (analytic)

COUNTRY CODES

AD	Andorra
AE	United Arab Emirates
AF	Afghanistan
AL	Albania
AR	Argentina
AT	Austria
AU	Australia
BB	Barbados
BD	Bangladesh
BE	Belgium
BG	Bulgaria
BH	Bahrain
BI	Burundi
BM	Bermuda
BO	Bolivia
BR	Brazil
BS	Bahamas
BT	Bhutan
BU	Burma
BW	Botswana
BY	Byelorussian Soviet Socialist Republic (Byelorussian SSR)
CA	Canada
CB	Khmer Republic
CE	Ceylon
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Ivory Coast
CL	Chile
CM	United Republic of Cameroon
CN	China
CO	Columbia
CR	Costa Rica
CS	Czechoslovakia
CU	Cuba
CY	Cyprus
DD	German Democratic Republic
DE	Germany, Federal Republic of (F.R. Germany)
DK	Denmark
DO	Dominican Republic
DY	Dahomey
DZ	Algeria
EA	European American Committee Reactor Physics
EC	Ecuador
ED	European American Nuclear Data Committee
EG	Egypt
ER	European Space Research Organization
ES	Spain
ET	Ethiopia
EU	European Company for the Chemical Processing of Irradiated Fuels
FI	Finland
FJ	Fiji
FR	France
GA	Gabon
GB	United Kingdom of Great Britain and Northern Ireland (UK)
GD	Grenada
GH	Ghana
GM	Gambia
GN	Guinea
GQ	Equatorial Guinea
GR	Greece
GT	Guatemala
GW	Guinea-Bissau
GY	Guyana
HK	Hong Kong
HN	Honduras
HT	Haiti
HU	Hungary
HV	Upper Volta
IA	Inter-American Nuclear Energy Commission
IB	International Bank for Reconstruction and Development
ID	Indonesia
IE	Ireland
IG	Inter-Governmental Maritime Consultative Organization
II	International Commission on Radiation Units and Measurements
IL	Israel

IN India
IO International Labor Organization
IP International Union of Pure and Applied Physics
IQ Iraq
IR Iran
IS Iceland
IT Italy
IX International Union of Pure and Applied Chemistry

JM Jamaica
JO Jordan
JP Japan

KE Kenya
KH Cambodia
KP Democratic People's Republic of Korea
KR Korea, Republic of
KW Kuwait

LA Laos
LB Lebanon
LI Liechtenstein
LK Sri Lanka
LR Liberia
LS Lesotho
LU Luxembourg
LY Libyan Arab Republic

MA Morocco
MC Monaco
MG Madagascar
ML Mali
MN Mongolia
MR Mauritania
MT Malta
MU Mauritius
MV Maldives
MW Malawi
MX Mexico
MY Malaysia

NE Niger
NG Nigeria
NI Nicaragua
NL Netherlands
NO Norway
NP Nepal
NR Nauru
NZ New Zealand

OE Organization for Economic Cooperation and Development
OM Oman

PA Panama
PE Peru
PG Papua New Guinea
PH Philippines
PK Pakistan
PL Poland
PR Puerto Rico
PT Portugal
PY Paraguay

QA Qatar

RH Southern Rhodesia
RO Romania
RW Rwanda

SA Saudi Arabia
SD Sudan
SE Sweden
SG Singapore
SK Sikkim
SL Sierra Leone
SM San Marino
SN Senegal
SO Somalia
SU Union of Soviet Socialist Republics (USSR)
SV El Salvador
SY Syria
SZ Swaziland

TC Trucial Oman
TD Chad
TG Togo
TH Thailand
TN Tunisia
TO Tonga
TR Turkey
TT Trinidad and Tobago
TW Taiwan
TZ United Republic of Tanzania

UA Ukrainian Soviet Socialist Republic (Ukrainian SSR)
UE United Nations Educational, Scientific and Cultural Organization
UF United Nations Children's Fund
UG Uganda
UI United Nations Industrial Development Organization
US United States of America (USA)
UY Uruguay

VA Holy See
VD Democratic Republic of Viet-Nam
VE Venezuela
VS Republic of Viet-Nam

WM World Meteorological Organization
WS Western Samoa

XA International Atomic Energy Agency (IAEA)
XC European Organization for Nuclear Research (CERN)
XE Commission of the European Communities (CEC)
XF Food and Agriculture Organization of the United Nations (FAO)
XJ Joint Institute for Nuclear Research (JINR)
XM Council for Mutual Economic Assistance (CMEA)
XN Nuclear Energy Agency of the OECD (NEA)
XO Organization of African Unity (OAU)
XR International Commission on Radiological Protection (ICRP)
XS International Organization for Standardization (ISO)
XU United Nations (UN)
XW World Health Organization (WHO)
XX World Energy Conference (WEC)

YD Democratic Yemen
YE Yemen
YU Yugoslavia

ZA South Africa
ZM Zambia
ZR Zaire

* U.S. GOVERNMENT PRINTING OFFICE: 1983-646-052:9

Cut out appropriate form and mail in a stamped envelope to the address indicated.

Change of Address Form

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to:

NEW ADDRESS
Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

Subscription Order Form

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

AVAILABILITY OF REFERENCES ABSTRACTED

REPORTS

Most reports abstracted in this publication may be obtained from

National Technical Information Service (NTIS)
5285 Port Royal Road
Springfield, VA 22161

or

DOE Technical Information Center (TIC)
P. O. Box 62
Oak Ridge, TN 37830
ATTN: Customer Services Division

Note: DOE offices and contractors should order from TIC; all others should order from NTIS. For more specific information on ordering, please note the introductory paragraph to the Report Number Index. For assistance in obtaining reports that do not have an Order No. (DE...) or other availability indicated in the citation or Report Number Index, contact TIC.

PATENTS

Although not cataloged as reports, patents cited from each country are listed in the Report Number Index under PATENTS-AU, PATENTS-FR, PATENTS-US, etc. U. S. Patent Applications, e.g., A 293,415, are available from NTIS.

NON-REPORT DOCUMENTS

Check the citation closely for the availability of such documents as journal articles, conference papers, books, and monographs. It may be necessary to request directly from the publisher or originator or to contact local, state, or university libraries or commercial reprint services.

Dissertations are available from University Microfilms International, Dissertation Copies, P. O. Box 1764, Ann Arbor, MI. Please request by Order No., e.g., DA82-11997.

OTHER

When GPO is cited as available source, order from Superintendent of Documents, Government Printing Office, Washington, D. C. 20402.

REPORT COLLECTIONS

The libraries listed below purchase and maintain microfiche collections of DOE and foreign reports. Most of these libraries have microfiche reader-printers or other photocopy facilities with which to reproduce enlarged copies from microfiche. Charges for reproduction services vary.

United States

ARIZONA
Tucson, University of Arizona

CALIFORNIA
Davis, University of California
Los Angeles, University of California
Santa Barbara, University of California

COLORADO
Boulder, University of Colorado

DISTRICT OF COLUMBIA
Washington, Library of Congress

FLORIDA
Gainesville, University of Florida

GEORGIA
Atlanta, Georgia Institute of Technology

ILLINOIS
Urbana, University of Illinois

INDIANA
Lafayette, Purdue University

KANSAS
Manhattan, Kansas State University

KENTUCKY
Lexington, University of Kentucky

LOUISIANA
Baton Rouge, Louisiana State University

MARYLAND
College Park, University of Maryland

MASSACHUSETTS
Cambridge, Massachusetts Institute of Technology

MISSISSIPPI
Mississippi State, Mississippi State University

MISSOURI
Columbia, University of Missouri
Kansas City, Linda Hall Library

NEBRASKA
Lincoln, University of Nebraska

NEW JERSEY
Princeton, Princeton University

NEW MEXICO
Albuquerque, University of New Mexico

NEW YORK
Albany, New York State Library
Ithaca, Cornell University
New York, Columbia University
Rochester, University of Rochester

NORTH CAROLINA
Raleigh, North Carolina State University

OHIO
Cincinnati, University of Cincinnati
Cleveland, Cleveland Public Library

OKLAHOMA
Norman, University of Oklahoma

PUERTO RICO
San Juan, University of Puerto Rico

SOUTH CAROLINA
Columbia, University of South Carolina

TEXAS
Austin, University of Texas
College Station, Texas A & M University
Houston, Rice University

UTAH
Salt Lake City, University of Utah

WASHINGTON
Pullman, Washington State University
Seattle, University of Washington

WISCONSIN
Madison, University of Wisconsin

International

EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM)
Brussels, Belgium
Ispra, Varese, Italy, Cetis Library

INTERNATIONAL ATOMIC ENERGY AGENCY (IAEA)
Vienna, Austria

OECD NUCLEAR ENERGY AGENCY (NEA)
British Library Lending Division
Boston Spa, Wetherby, Yorkshire, England

DOE/RECON SYSTEM

COMPUTER SEARCH SERVICE

DOE/RECON is an interactive on-line information retrieval system developed to provide rapid and easy access to energy-related data bases. The acronym RECON stands for REmote CONsole, which signifies that the system can be accessed by users located at various sites across the United States.

The system permits users to carry on a dialogue with the computer. This dialogue allows browsing through large data bases and can result in retrieval of citations which answer specific needs. Desired information can be selectively retrieved via simple yet powerful commands sent to the computer from the terminal keyboard.

Search logic may be formulated by the use of indexed terms, such as keywords, authors, categories, or corporate authors. As the search session progresses, AND, OR and NOT Boolean logic may be used to improve precision, i.e., the specificity of the retrieved set. For most data bases, the user may limit the scope of the search to particular years or volumes of data. Upon completion of a search, the user may choose to have the results displayed or printed at his/her terminal or to have the results printed and mailed the following day.

The DOE/RECON system is supported by dual IBM 370/3033 computers. Two IBM 3705 front-end communications computers are used to perform the message switching. Although most of the 40 data bases are bibliographic in content, DOE/RECON is not limited to this type; the Research in Progress (RIP) data base is one that is non-bibliographic. Presently, over 2 million references are available.

Requests for information concerning authorization to access the DOE/RECON system should be addressed to:

Thomas D. Sample
Technical Information Center
U. S. Department of Energy
P. O. Box 62
Oak Ridge, TN 37830

UNITED STATES DEPARTMENT OF ENERGY
P.O. BOX 62
OAK RIDGE, TENNESSEE 37830

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

POSTAGE AND FEES PAID
UNITED STATES
DEPARTMENT OF ENERGY

3227 FS- 1
UNIVERSITY MICROFILMS INTERNATIONAL
ATTN SERIALS PROCESSING
300 NORTH ZEEB RD
ANN ARBOR, MI 48106